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14. ABSTRACT: Sleep disturbance is nearly ubiquitous among individuals suffering from PTSD and is a major problem among service members returning from combat deployments. Recent evidence suggests that adequate restorative sleep may a crucial component in the ability to generalize fear extinction learning, and ultimately may be a key feature in the process of recovery from PTSD. Based on accumulating evidence that the circadian system and sleep-wake patterns are quite powerfully affected by exposure to light, we proposed to use light therapy to regulate the sleep wake schedule of individuals with PTSD, thereby potentially enhancing recovery. Further, because blue-wavelengths have been shown to activate specific intrinsically photosensitive retinal ganglion cells (ipRGCs), that play a key role in regulating the circadian pacemaker in the suprachiasmatic nucleus of the hypothalamus, we hypothesized that blue light therapy (BLT) would be more effective than a similar amber wavelength light therapy (ALT). We compared 6-weeks of BLT versus ALT on a variety of sleep, symptom, cognitive, and brain outcome measures in individuals meeting criteria for PTSD. Overall, we found that BLT was more effective than ALT at improving total sleep time. These improvements in the amount of sleep were associated with reductions in PTSD symptoms on the CAPS. Additionally, the BLT condition was associated with greater retention of extinction memories following a fear conditioning and extinction protocol. Moreover, the BLT condition was associated with an increase in ventral-medial prefrontal activation and a decrease in dorsolateral prefrontal and amygdala activation in response to previously feared and then extinguished stimuli. We also demonstrated that decreased activation was observed across many of the anatomical regions associated with fear-based responses, including the hippocampus, insula, and dorsal anterior cingulate cortex for BLT versus ALT. We also found that the activation within the vmPFC was related to depression symptomology changes, with greater activation associated with greater decreases in depression. Task based fMRI also supported the role of BLT and greater total sleep time in facilitating increased prefrontal activation, which has consistently been associated with greater recovery from PTSD. These preliminary findings add to a growing body of research that suggest that light therapy may be useful for facilitating recovery from PTSD. These preliminary findings suggest that BLT may be useful as an adjunctive treatment to maximize gains made from other ongoing therapeutic approaches and suggest that further research into the use of light therapy approaches for PTSD is warranted.

15. SUBJECT TERMS
trauma, anxiety, stress, depression, nightmares, irritability, light therapy, veteran, military, assault, combat, fMRI, hyperarousal, posttraumatic stress disorder, neuroimaging, flashbacks

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1. INTRODUCTION

Sleep disturbance is one of the most common symptoms reported by individuals with posttraumatic stress disorder (PTSD) and is a major problem among Service members returning from combat deployments (Capaldi et al., 2011). In fact, sleep problems are often considered to be among the most prevalent complaint of individuals with PTSD (Ross et al., 1989), and may contribute significantly to the persistence and severity of the disorder (Germain et al., 2008; Maher et al., 2006; Mellman & Hipolito, 2006). Several studies have demonstrated that sleep is necessary for adequate emotional health (Harvey, 2011; Killgore et al., 2008; Rosales-Lagarde et al., 2012; Simon et al., 2015; Walker, 2009; Walker & van der Helm, 2009). Furthermore, recent evidence suggests that adequate restorative sleep may be a crucial component of the ability to generalize fear extinction learning, and may ultimately be a key feature in the process of recovery from PTSD (Pace-Schott et al., 2009). The present study aims to test a novel, inexpensive, and easy to use non-pharmacologic approach to improving sleep and regulating circadian rhythms among individuals with PTSD. In this study, we will evaluate the effectiveness of a brief (30 minute) daily morning blue wavelength light exposure therapy (BLT) for improving sleep compared to similar use of an amber light placebo device within a sample of individuals diagnosed with PTSD. Morning exposure to blue light is known to re-set the circadian sleep-wake cycle and entrain a healthy rhythm of bed and wake times. There is convincing evidence that BLT has therapeutic effects on anxiety and depression (Anderson et al., 2009). Although sleep and circadian problems are all central to the symptomatology of PTSD, there is virtually no scientific information about the effects of BLT on PTSD. For this study, collected data from a sample of participants meeting diagnostic criteria for PTSD. The goal was to obtain data from 90 participants, but the data collection was ended prematurely due to the COVID-19 pandemic, resulting in a total of 84 completed participants. Briefly, following a baseline assessment, the participants were randomly assigned to one of two treatment conditions (44 active Blue treatment; 40 amber placebo). Participants completed two comprehensive sessions including neurobehavioral assessments, experimental fear conditioning and extinction, repeated polysomnographic sleep studies, and neuroimaging sessions separated by six weeks of home monitored actigraphy with active or placebo light device treatment each morning. Participants were randomly assigned to receive 30 minutes of daily morning blue light therapy (BL) or an amber light placebo treatment (PL). Sleep quality and quantity were measured using daily self-report questionnaires, objective actigraph readings, and polysomnography. Globally, we hypothesized that BL would improve sleep quality and quantity relative to PL, and these improvements would be associated with improvements in neurocognitive performance and brain function. Enrollment is now closed, and final data analysis is underway. If the BL treatment is demonstrated as effective, this approach would be readily available for nearly immediate large-scale implementation, as the devices have been widely used for years in other contexts, are already safety tested, and commercially available from several manufacturers at a reasonable cost. Thus, the impact of this research as an adjunctive treatment for emotional and sleep problems associated with PTSD would be high and immediate.

2. KEYWORDS:

trauma, anxiety, stress, depression, nightmares, irritability, light therapy, veteran, military, assault, combat, fMRI, hyperarousal, posttraumatic stress disorder, neuroimaging, flashbacks

3. ACCOMPLISHMENTS:

- **What were the major goals of the project?**
  According to the Statement of Work (SOW), the following major tasks were proposed:

  Major Task 1: Prepare Regulatory Documents and Research Protocol (Y1: Q1)
  Completed: 22 OCT 2014

Major Task 2: Acquire necessary materials and equipment (Y1: Q1-2)
Completed: 01 FEB 2015

Major Task 3: Hire and Train Study Staff (Y5: Q3-4)
Completed: 23 SEP 2019

Major Task 4: Collect Data (Y1, Y2, Y3, Y4, Y5, Y6, Y7)
In progress: 12-month follow up data collection is ongoing

Major Task 5: Analyze and Report Data (Y6: Q3-4, Y7: Q1-2)
Completed: 27 JULY 2021

- **What was accomplished under these goals?**

Recruitment.

Recruitment completed for this study. The COVID-19 pandemic caused major disruptions in the ability to complete this project as originally scheduled. In the spring of 2020 (Y6 Q2), the Governor of the State of Arizona issued a statewide stay-at-home order. Consistent with that order, and the recommendations made by the President of the United States, the University of Arizona closed all non-essential university and research activities, and enacted a policy prohibiting in-person contact with research participants for an indeterminate period. As it became clear that the shut-down would prevent us from further data collection for the foreseeable future, we discussed this issue with our Science Officer, Ms. Inna Williams, via email on March 17-18, 2020. Given that we had already collected complete data from 84 of the proposed 90 participants (91% of the target sample size), it was recommended that the project be closed to new enrollment and new data collection, and that remaining efforts focus on completing data collection and final analyses. Therefore, on March 18, 2020, the study was closed to new enrollment.

Figure 3.1 summarizes the recruitment process for this study. Cumulatively, 3,998 individuals completed a telephone screening to determine whether initial eligibility criteria were met for this study (e.g., aged 18-50, experienced a qualifying traumatic event in the past 10 years). Of these 3,998 individuals, 234 individuals completed a clinical interview to determine final eligibility for the study. 105 individuals were found to be eligible, and 15 discontinued participation between the screening and baseline visit. Thus, 90 were randomized to a light condition (i.e., attended their baseline visit). 6 individuals withdrew from the study between their baseline and post-treatment visits (n=3 in Blue light condition and n=3 in Amber/Placebo light condition) for reasons such as incarceration and personal/family illness. No participants withdrew from the study due to side effects or intolerance of the light treatment.

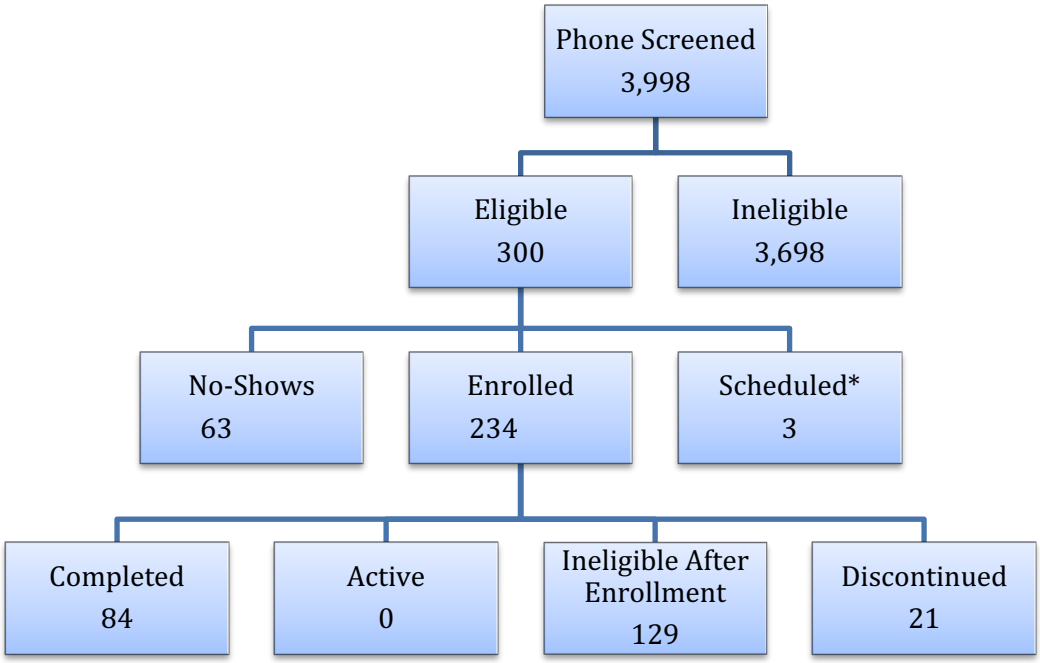


Figure 3.0.1: Participant flow diagram of cumulative participant numbers. *Scheduled refers to the number of individuals who were scheduled to come in for their screening visits at the time that the study was closed to further recruitment. These individuals did not enroll in the study.

A total of 21 participants (15 before randomization, 6 after randomization) discontinued or were excluded before completing all phases of the study due to noncompliance with study procedures (*n*=7), suicidality (*n*=1), pregnancy (*n*=1), metal in body (*n*=1), becoming incarcerated (*n*=1), moving away (*n*=2) and miscellaneous personal circumstances (*n*=8). No participants discontinued due to difficulties tolerating the light treatment.

Overall, 90 participants were enrolled and randomized to either the blue light treatment (BLT, *n*=46) or Amber/Placebo (PLT, *n*=44). Of those who were randomized, 6 participants discontinued prematurely (*n*=3 BLT, *n*=3 PLT). Thus, the final dataset comprises 84 datasets (*n*=43 BLT, *n*=41 PLT) for individuals who completed the six-week blue or amber light treatment. 14 males and 27 females received PLT, while 16 males and 27 females received BLT. Due to restrictions placed on in-person data collection at the University of Arizona as a result of COVID-19, one blue and one amber dataset contain only questionnaire responses for post-treatment data.

The breakdown of ethnicity for these participants is 61.9% White (*n*=52), 19.1% Hispanic/Latino (*n*=16), 3.6% Black/African-American (*n*=3), 2.38% Native American (*n*=2), 1.19% Asian (n=1), and 11.9% Mixed Race (*n*=10).

Recruitment – Exclusion.

Exclusion of a large number of individuals was necessary in order to ensure validity of PTSD diagnoses, eliminate potential confounds in the data, and to ensure participant safety (see Figure 3.2 for the breakdown of participant ineligibility over the course of the study). The most common reasons for ineligibility included losing interest in the study between initial contact and telephone screening (19% of individuals) and taking exclusionary medication that could affect sleep or neuroimaging scans (12% of individuals). Additional screening criteria that lead to immediate exclusion included: ferrous metal in the

body (contraindication for MRI), age outside of the inclusion range, non-qualifying traumatic event, traumatic brain injury with loss of consciousness exceeding 30 minutes, English as a non-primary language, failure to meet DSM-5 criteria for PTSD, trauma occurring more than 10 years before time of screening, suffering from seizures or light-induced migraines, or left-handedness.

As shown in Figure 3.2, 7% of participants were screened out for reasons coded as "Other," a category that encompasses exclusionary reasons ranging from colorblindness to working overnight shifts. After the exclusion of 3,698 potential volunteers, there remained 300 potentially eligible volunteers. Of these, 63 failed to attend their initial assessment visit and were unable or unwilling to be rescheduled, while 234 completed the consenting process, were enrolled in the study, and underwent a structured clinical interview for DSM-5. Of those 234 participants who completed the consenting process and a clinical interview, 129 were found to be ineligible upon administration of the SCID (i.e., did not meet diagnostic criteria for PTSD or met criteria for certain exclusionary co-morbid psychiatric disorders such as bipolar disorder) or were identified to be unable to continue due to other issues such as current substance abuse, legal problems, or admitting to taking exclusionary medications.

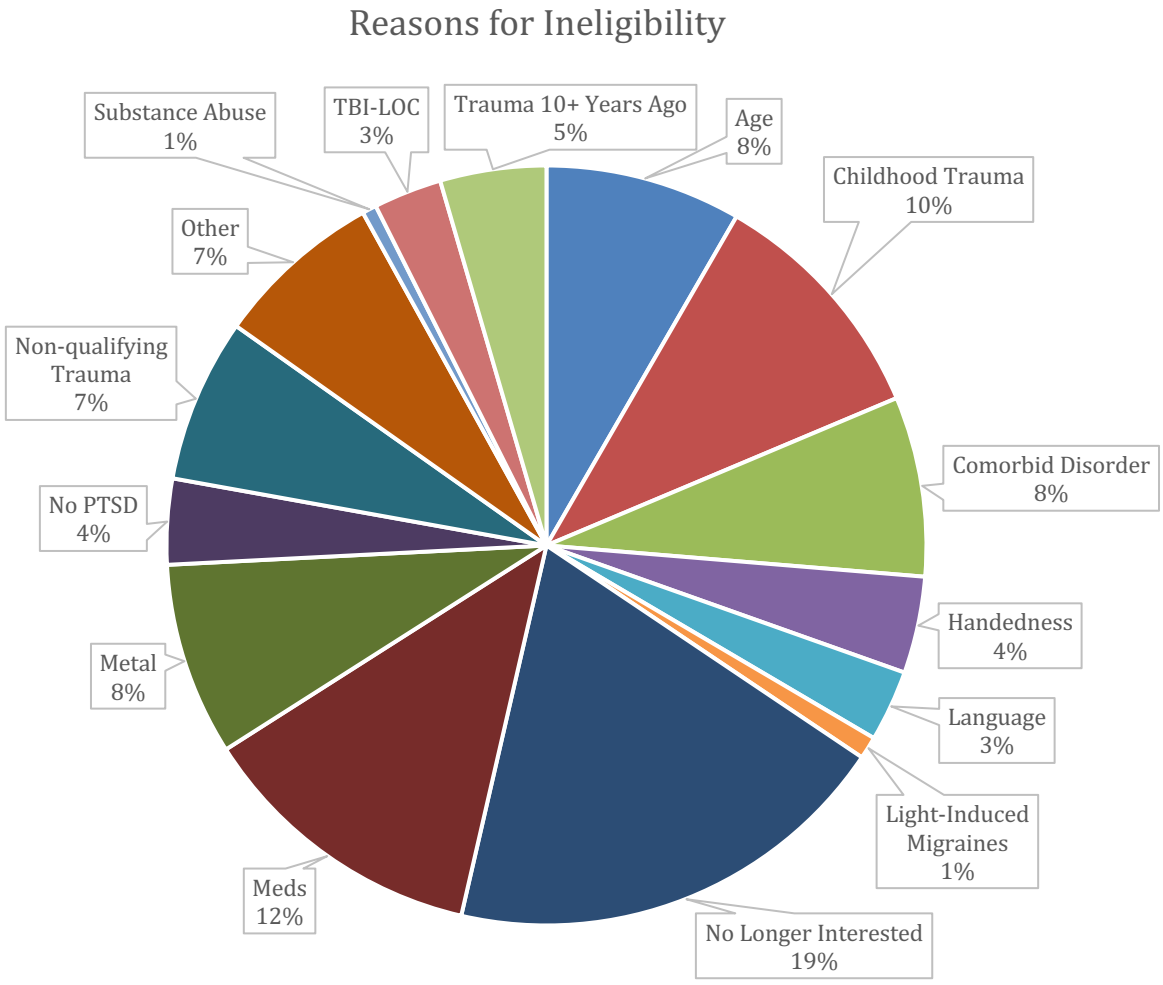


Figure 3.0.2: Cumulative ineligibility reasons across the duration of the study.

Data Collection.

The final sample included N = 84 completed participants.

Data Management.

Study staff utilized REDCap, a HIPAA compliant digital storage database, to compile the final dataset for the study.

Statistical Analysis.

- *Behavioral data*: neuropsychological assessments and self-report questionnaires resulted in over 459 variables of interest. These data were imported to IBM SPSS v. 27 for statistical analysis.
- *Neuroimaging data:* Multimodal imaging data included high-resolution anatomical scans (T1 weighted MPRAGE), diffusion tensor imaging (DTI), and resting state functional connectivity (FC). Imaging data were analyzed using SPM, CONN, FSL, and TBSS.

Specific Objectives.

The stated objectives are as follows:

- **Objective 1**: Evidence suggests that morning bright light therapy suppresses daytime melatonin and leads to an entrainment of the circadian rhythm that modulates daytime alertness and nighttime sleep. The first objective will be to assess the validity of this effect in PTSD patients.
    - **Hypothesis 1: Six weeks of BLT will improve sleep relative to PL among PTSD subjects.**
        - **1a**: Six weeks of morning blue light therapy (BLT) will improve objective and subjective measures of sleep duration and quality as measured by actigraphy, sleep logs, sleep scales, and polysomnography relative to an amber light placebo therapy (PL) condition.
- **Objective 2**: If light therapy is successful in entraining the circadian rhythm and improving nighttime sleep in patients with PTSD, this should be associated with improvement in symptoms and cognitive functioning, as sleep has been shown to be critical in the process of extinguishing conditioned fears. Therefore, the second Aim is to evaluate the association between changes in sleep patterns and improvement in symptom expression, emotional wellbeing, and cognitive functioning in patients with PTSD. However, even if Aim 1 is not successful, the present study will provide important cross-sectional data regarding the relationship between measured sleep, cognitive functioning, and fear extinction in individuals with PTSD.
    - **Hypothesis 2: BL will improve cognitive functioning, symptoms of PTSD, and generalization of fear extinction relative to PL.**
        - **2a**: Six weeks of BL will improve measures of neurocognitive (i.e., memory and executive functions) and mood functioning relative to PL.
        - **2b**: The PTSD group receiving six weeks of BL will show significant reduction in self-reported symptom scores on the PTSD symptom checklist and CAPS, lower emotional distress on clinical measures, and greater *generalization of conditioned fear extinction* relative to the PTSD group receiving PL.
- **Objective 3**: The present study aims to provide clear evidence of functional and neurochemical changes that are associated with changes in sleep, cognition, and PTSD symptoms from pre- to post-treatment. Even if Objective 1 is not supported, the obtained cross-sectional data will provide critical insights regarding the association between sleep, neurometabolites, and brain function

within patients with PTSD. This correlational information is currently lacking for PTSD and will fill an important knowledge gap regardless of whether the light therapy is successful.

- **Hypothesis 3: Six weeks of BL will produce reliable changes in brain activation and neurochemistry relative to PL, particularly for PTSD subjects.**
  - **3a**: Relative to PL, six weeks of BL will lead to significantly increased ventromedial prefrontal activation and reduced amygdala activation during the backward masked affect fMRI task.
  - **3b**: Relative to PL, six weeks of BL will lead to significantly greater negative functional connectivity between the ventromedial prefrontal cortex and amygdala during resting state fMRI.
  - **3c**: Relative to PL, six weeks of BL will be associated with increased activation of the VMPFC, and reduced activation within the amygdala and dorso-medial prefrontal cortex during the extinction recall scan.
  - **3d**: Relative to PL, six weeks of BL will be associated with increased levels of GABA and reduced glutamate in the amygdala-hippocampal complex and anterior cingulate gyrus as measured by proton magnetic resonance spectroscopy (1H MRS).
  - **3e**: Relative to PL, six weeks of BL will produce increased levels of N-acetyl-aspartate (NAA), choline (Cho), and reduced phosphocreatine (Cr) within the amygdala-hippocampal complex and anterior cingulate gyrus.

- **Objective 4**: The fourth objective is to demonstrate whether changes in subjective and objective measures of sleep are associated with changes in symptom severity, cognitive functioning, brain activation, and neurochemistry. Regardless of the success of the light therapy approach outcome in Aim 1, the available data will provide some of the first longitudinal data examining changes in sleep patterns over time in individuals with PTSD and their correlation with these other metrics. Thus, useful data will be acquired even if the primary hypothesis of Aim 1 is not supported.
  - **Hypothesis 4: Improvements in sleep noted in Hypothesis 1, will be linearly correlated with improvements in cognitive and symptom functioning in Hypothesis 2 and structural and functional brain changes in Hypothesis 3.**
    - **4a**: Changes in sleep parameters identified in Hypothesis 1 will correlate with improvements in memory, executive functioning, and neuropsychological performance on neurocognitive measures described in Hypothesis 2.
    - **4b**: Changes in sleep parameters identified in Hypothesis 1 will correlate with changes in neurochemistry as outlined in Hypothesis 3d and 3e above.

These objectives were accomplished, as described in detail in the following section.

3.A. Overview

This double-blind, placebo-controlled study included 84 participants who experienced a traumatic event in the past 10 years and met the DSM-5 criteria for PTSD at the time of enrollment. Figure 3.3 provides an overview of the study design including Visit 1 for screening and a structured clinical interview to assess PTSD, Visit 2 to collect baseline measures, 6-weeks BLT or PLT, and Visit 3 to collect post-treatment measures.

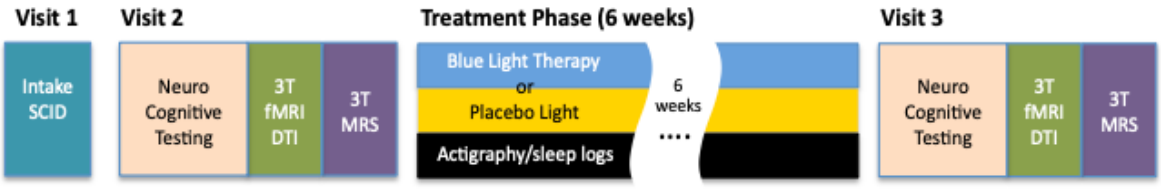


Figure 3.0.3. Study Design: Participants attended 3 separate sessions. Visit 1 was an intake session that included consent forms, WASI-2, and SCID assessment. Visits 2 and 3 were identical and included a comprehensive neurocognitive test battery and neuroimaging. Visits 2 and 3 were separated by a 6-week period where participants underwent either Blue Light Therapy or Amber Placebo Light Treatment for 30 minutes each morning.

Visit 1 (Screening).

Participants first attended a screening visit to confirm eligibility via the Structured Clinical Interview for the DSM-5 (SCID-5) and the Weschler Abbreviated Scale of Intelligence 2nd Edition (WASI-II). Participants then spent a week completing at-home sleep diaries and activity monitoring using a Respironics Actiwatch Spectrum®, a wearable activity monitor. The Actiwatch Spectrum devices collected daily sleep, activity, and light exposure data to generate total sleep time, sleep efficiency, sleep onset latency, and wake after sleep onset (WASO) indices.

Visit 2 (Baseline)

During the baseline visit, participants completed a comprehensive neurocognitive assessment battery. Appendix A provides a comprehensive list of assessments administered to study participants. Additionally, full assessments, as administered to participants are located in Appendix B.

Fear Conditioning: In addition to the neurocognitive assessment battery, participants underwent the habituation, conditioning, and extinction phases of our team's *de novo* fear conditioning/fear extinction paradigm during Visit 2. Subjects first chose a level of mild electric shock that is "highly annoying but not painful" while being administered shocks of increasing intensities through electrodes connected to two fingers. For this paradigm, the conditioned stimuli (CSs) consisted of digital photographs of three differently colored vehicles (blue, red or yellow) displayed on a computer screen within the image of two different photographic environments (contexts), a "conditioning context" in which the unconditioned (shock) stimulus (US) accompanied certain CSs (CS+s) during Conditioning and an "extinction context" in which CS+s occurred without USs during the Extinction and Extinction Recall phases. Before each experimental phase except Habituation, subjects were told they "may or may not be shocked." During Conditioning, 16 CS+'s (8 each of 2 different colors) were presented in the conditioning context and a 0.5-sec US (shock) immediately followed the offset of 10 of 16 CS+

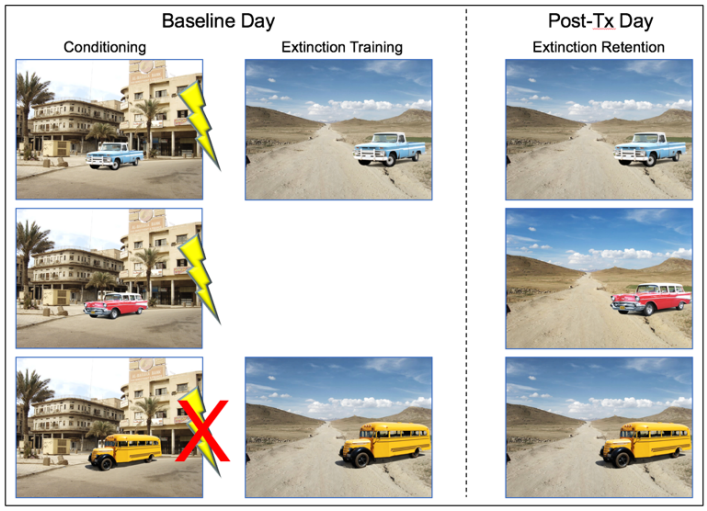


Figure 3.0.4. Fear condition paradigm administered to participants. Conditioned stimuli of blue red and yellow vehicles are shown in the first column. Electric shocks to conditioned stimuli are shown by yellow lightning bolt.

presentations (5 of the 8 of each CS+ color). Sixteen randomly interspersed presentations of the third vehicle color (CS-s) were never paired with the US. During the Extinction phase, one CS+ color (CS+E) appeared 16 times in the extinction context, along with 16 interspersed CS-s and no USs. The other CS+ color (CS+U) did not appear and therefore remained un-extinguished. The measurement of conditioned fear was palm-recorded skin conductance response (SCR), a reliable index of sympathetic activation.

Neuroimaging: During Visit 2, participants took part in a neuroimaging session comprised of the following:

1. High resolution anatomical (T1 weighted MPRAGE)
2. Resting state functional connectivity (FC)
3. Task-based functional magnetic resonance imaging (fMRI) - Backward Masked Affect Task (BMAT)
    a. A series of facial expressions of happiness or fear are displayed, each for only 16 msec and masked immediately by a neutral image for 184 msec. At this rate of presentation, the "masked" affective expression is not consciously perceived yet is still processed via an extrastriate pathway to the amygdala that bypasses normal cortical processing.
4. Task-based functional magnetic resonance imaging (fMRI) - Anticipation Task
    a. The Emotional Anticipation Task was adapted on the basis of Aupperle et al.'s (2013) study design and lasts a total of 7 min and 8 seconds. Two version of the anticipation tasks were used, in order to have two different versions of the tasks for the baseline and follow up visit. Participants were presented with a grey background with a black arrow alternating randomly in its direction from left to right (Baseline). Participants were instructed to indicate, via a button press, which direction the arrow was pointing. Participants were told that when the screen turns yellow, a negative picture will soon appear (Negative Anticipation (NA)). If the screen turns blue, a positive picture will soon appear (Positive Anticipation (PA)), and if the screen turns green a positive *or* a negative picture will soon appear (Uncertain Anticipation (UA)). The picture stimuli consist of positive and negative pictures from the International Affective Picture System (IAPS). The most unpleasant (e.g., mutilated bodies) as well as the most pleasant (e.g., animals) pictures were chosen from the picture set. The aim of this task was to investigate whether BLT, compared to PLT intervention changes neural responses during anticipation of negative stimuli.
5. Spectroscopy (MEGA-PRESS Proton Magnetic Resonance Spectroscopy)
6. Field map
7. Diffusion tensor imaging (DTI)
8. Axial flair

Psychomotor Vigilance Test: Participants were administered the 3 sessions of the Psychomotor Vigilance Test (PVT) two hours apart. The PVT is a 10-minute computerized measure of sustained attention and psychomotor vigilance that has been shown to be exquisitely sensitive to sleep deprivation. The PVT currently serves as the "gold standard" for assessing degradation in alertness and vigilance following sleep loss.

Modified Sleep Latency Test: Additionally, participants underwent 3 modified sleep latency tests (MSLT), each separated by a period of 2 hours, with polysomnographic (PSG) recording over the course of the assessment day. Participants were fitted with a standard electrode montage and PSG recordings were collected using Polysmith 11.0. Participants were given 20 minutes to fall asleep in a private, darkened, sound-attenuated bedroom.

Repeatable Battery for the Assessment of Neuropsychological Status: Participants also completed the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). The RBANS is a brief battery of well-normed neuropsychological tests with two alternate forms (RBANS A and RBANS B) to permit repeated testing. The test provides several index scores, including: Total Score, Immediate Memory, Visuospatial/Constructional, Language, Attention, and Delayed Memory.

Emotional Functioning/Coping/Symptom Severity: PTSD severity was assessed using the 20-item National Center for PTSD Checklist, Military Version (PCL-5), Patient Health Questionnaire (PHQ-9), and Clinician Administered PTSD Scale-5 (CAPS-5). Further assessment of psychopathology was made via administration of the Beck Depression Inventory (BDI-II); Beck Anxiety Inventory (BAI); and Spielberger State-Trait Anxiety Inventory (STAI). Participants also completed measures resilience (Connor-Davidson Resilience Scale (CD-RISC)), Evaluation of Risks (EVAR), the Satisfaction with Life Scale (SWLS) and the Gratitude Questionnaire (GQ6). The Balloon Analogue Risk Test (BART) was administered to measure risk taking.

Subjective Sleep Measures: To assess general sleep quality, daytime sleepiness, and parasomnias, participants completed the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989) (Buysse, Reynolds et al. 1989) (Buysse, Reynolds et al. 1989), the Epworth Sleepiness Scale (ESS), the Insomnia Severity Index (ISI) (Bastien et al., 2001) (Bastien, Vallieres et al. 2001) (Bastien, Vallieres et al. 2001), the Functional Outcomes of Sleep Questionnaire (FOSQ), and the Disturbing Dream and Nightmare Severity Index (DDNSI). The Stanford Sleepiness Scale (SSS) was completed at three times during the assessment day.

At the end of the baseline visit, participants were provided with a goLITE® unit which emitted either blue (active) or amber (placebo) LED light. The goLITE BLU is commercially available and has a narrow bandwidth, peaking at λ = 469 nm, at 214 Lux, and panel irradiance mW/cm^2) = 1.23 at 20 cm. The amber LED system (goLITE AMBER) was employed for the placebo devices (λ = 578 nm, 188 Lux, and total irradiance (mW/cm^2) = 0.35).

Visit 3 (Post-Treatment)

The post-treatment visit was nearly identical to the baseline visit, with several exceptions described in detail below:

Fear Conditioning: At post-treatment, participants underwent the Extinction Recall phase of the offline (non-MRI) fear conditioning task. During the Extinction Recall phase, the 8 CS+Es and 8 CS+Us were presented in the extinction context with 16 interspersed CS-s and no USs.

Neuroimaging: In addition to the previously described neuroimaging scans and tasks, at Visit 3 participants were administered an MRI task to assess retention of fear extinction memory. While undergoing fMRI, participants viewed the previously conditioned images from the Fear Conditioning and Extinction Task. Here, 8 CS+E, 8 CS+U, and 16 CS- trials were presented without any shocks.

Lastly, participants were administered a brief questionnaire to assess whether participants believed they had been randomized to the active (BLT) or placebo (PLT) condition of the study.

SIGNIFICANT RESULTS/KEY OUTCOMES

3.B Specific Objectives/Aims/Hypotheses

Design. Individuals meeting criteria for PTSD completed two comprehensive sessions, including neurobehavioral assessments, repeated polysomnographic sleep studies, and neuroimaging sessions (functional MRI, structural MRI, and proton spectroscopy) separated by 6 weeks of actigraphically monitored at-home treatment using a light therapy device. Prior to the 6-week treatment period, participants were randomly assigned to receive 30 minutes of either daily morning blue light therapy (BLT) or an amber light placebo treatment (ALT). Sleep quality and quantity were measured using subjective reports, objective actigraph readings, and polysomnography. The general study overview is shown in Figure 3.5 below:

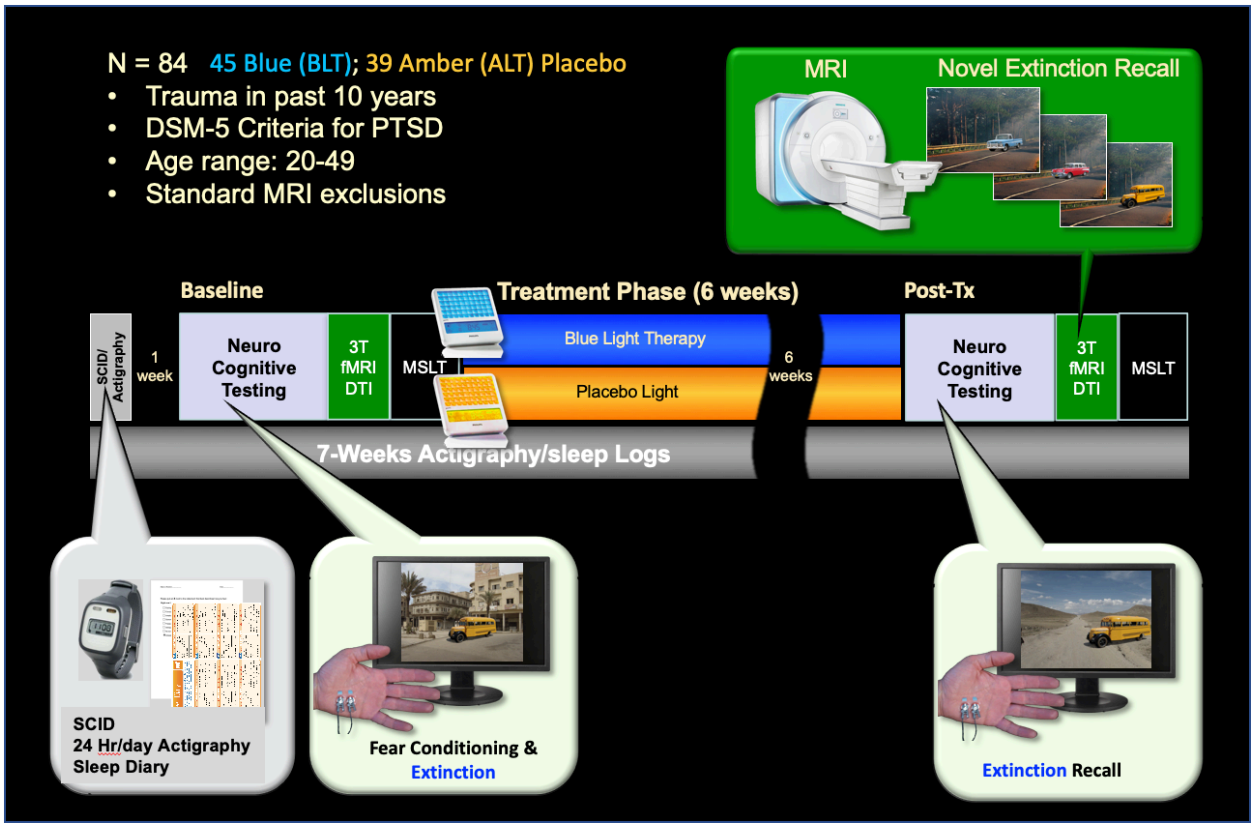


Figure 3.5. A general graphic overview of the study. The total study lasted 7 weeks and comprised an initial visit for structured clinical interview and actigraphy. After a week of at-home actigraphic assessment, participants returned for a Baseline assessment day that included neurocognitive testing (including a fear conditioning and extinction protocol), MRI neuroimaging at 3T, and a series of multiple sleep latency tests (MSLT). Participants were then randomly assigned to either the Blue Light Treatment (BLT) or placebo Amber Light Treatment (ALT). During treatment, participants used a light box (blue or amber) each morning for 30 minutes over the 6-week period. Participants returned to complete the same assessment battery at the end of the study.

Intervention. All participants were provided a goLITE® unit to take home, along with detailed training and instruction on its use. Depending on the light condition assigned, the goLITE will include either blue (BLT) or amber (ALT) LEDs. The goLITE BLU is commercially available and has a narrow bandwidth, peaking at λ = 469 nm, at 214 Lux, and panel irradiance mW/cm^2) = 1.23 at 20 cm. A similar appearing amber LED system (goLITE AMBER) was employed for the ALT devices, but with a peak at λ = 578 nm, at 188 Lux, and total irradiance (mW/cm^2) = 0.35. Both of these devices have undergone extensive ocular safety testing and have been used successfully without incident in our prior studies. Participants were instructed to use the unit each morning (within 2 hours of awakening and prior to 1100

hours) for 30 minutes per day over the 6-weeks treatment period. Participants were permitted to engage in sedentary activities (e.g., read, watch TV, surf the internet, eat, engage in daily hygiene) while the unit was activated, as long as the light was within arm's reach and projecting to the eyes from within a 45-degree angle to either side (see Figure 3.6). This same procedure has been used in our prior work and has been well tolerated by participants, allowing them considerable flexibility to choose whether to use the light immediately upon arising, or after morning hygiene, meals, drive, etc., but while still ensuring that all treatment occurs in the morning hours.

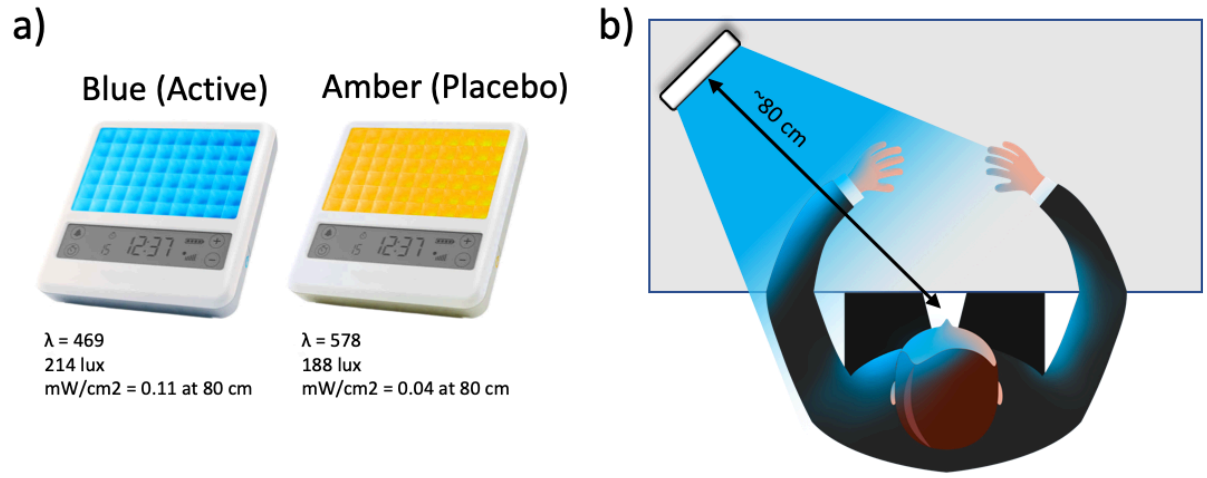


Figure 3.6 (**a**) Participants received either a blue (active condition) or amber (placebo condition) light box fitted with light-emitting diodes. **(b)** The participant was instructed to place the device at arm's length on a table at an approximately 45-degree angle and bathe their face with the light for 30-minutes each morning.

Aims and Hypotheses. Globally, we hypothesized that BLT would improve sleep quality and quantity relative to ALT placebo, and these improvements would be associated with improvements in PTSD symptoms, emotional functioning, neurocognitive function, alterations in proton metabolites in the limbic system and medial prefrontal cortex at follow-up assessment. The following were the Specific Aims and Hypotheses:

AIM 1: Evidence suggests that morning bright light therapy suppresses daytime melatonin and leads to an entrainment of the circadian rhythm that modulates daytime alertness and nighttime sleep. The first aim was to assess the validity of this effect in PTSD patients.

Hypothesis 1: Six weeks of BLT will improve sleep relative to ALT among PTSD subjects.

H1a: Six weeks of morning blue light therapy (BLT) will improve objective and subjective measures of sleep duration and quality as measured by actigraphy, sleep logs, sleep scales, and polysomnography relative to an amber light placebo therapy (ALT) condition.

AIM 2: If light therapy is successful in entraining the circadian rhythm and improving nighttime sleep in patients with PTSD, this should be associated with improvement in symptoms and cognitive functioning, as sleep has been shown to be critical in the process of extinguishing conditioned fears. Therefore, the second Aim was to evaluate the association between changes in sleep patterns and improvement in symptom expression, emotional wellbeing, and cognitive functioning in patients with PTSD. However, even if Aim 1 was not successful, we proposed that the present study will provide important cross-sectional data regarding the relationship between measured sleep, cognitive functioning, and fear extinction in individuals with PTSD.

Hypothesis 2: BLT will improve cognitive functioning, symptoms of PTSD, and generalization of fear extinction relative to ALT.

H2a: Six weeks of BLT will improve measures of neurocognitive (i.e., memory and executive functions) and mood functioning relative to ALT.

H2b: The PTSD group receiving six weeks of BLT will show significant reduction in self-reported symptom scores on the PTSD symptom checklist and CAPS, lower emotional distress on clinical measures, and greater generalization of conditioned fear extinction relative to the PTSD group receiving ALT.

AIM 3: At the time of project initiation, there were no known studies that had examined the neurobiological correlates of symptom improvement in patients with PTSD following light exposure therapy. The present study aimed to provide clear evidence of functional and neurochemical changes that are associated with changes in sleep, cognition, and PTSD symptoms from pre- to post-treatment. Even if the first aim (Aim 1) was not supported, the obtained cross-sectional data was expected to provide critical insights regarding the association between sleep, neurometabolites, and brain function within patients with PTSD. This correlational information is currently lacking for PTSD and will fill an important knowledge gap regardless of whether the light therapy is successful.

Hypothesis 3: Six weeks of BLT will produce reliable changes in brain activation and neurochemistry relative to ALT, particularly for PTSD subjects.

H3a: Relative to ALT, six weeks of BLT will lead to significantly increased ventromedial prefrontal activation and reduced amygdala activation during the backward masked affect fMRI task.

H3b: Relative to ALT, six weeks of BLT will lead to significantly greater negative functional connectivity between the ventromedial prefrontal cortex and amygdala during resting state fMRI.

H3c: Relative to ALT, six weeks of BLT will lead to significantly increased activation of the ventromedial and dorsolateral prefrontal cortex and reduced hippocampal activation during the fMRI memory suppression task.

H3d: Relative to ALT, six weeks of BLT will be associated with increased activation of the VMPFC, and reduced activation within the amygdala and dorso-medial prefrontal cortex during the extinction recall scan.

H3e: Relative to ALT, six weeks of BLT will be associated with increased levels of GABA and reduced glutamate in the amygdala-hippocampal complex and anterior cingulate gyrus as measured by proton magnetic resonance spectroscopy (1H MRS).

H3f: Relative to ALT, six weeks of BLT will produce increased levels of N-acetyl-aspartate (NAA), choline (Cho), and reduced phosphocreatine (Cr) within the amygdala-hippocampal complex and anterior cingulate gyrus.

AIM 4: The fourth Aim is to demonstrate whether changes in subjective and objective measures of sleep are associated with changes in symptom severity, cognitive functioning, brain activation, and neurochemistry. Regardless of the success of the light therapy approach outcome in Aim 1, the available

data was expected to provide some of the first longitudinal data examining changes in sleep patterns over time in individuals with PTSD and their correlation with these other metrics. Thus, useful data would be acquired even if the primary hypothesis of Aim 1 was not supported.

Hypothesis 4: Improvements in sleep noted in Hypothesis 1, will be linearly correlated with improvements in cognitive and symptom functioning in Hypothesis 2 and structural and functional brain changes in Hypothesis 3.

H4a: Changes in sleep parameters identified in Hypothesis 1 will correlate with improvements in memory, executive functioning, and neuropsychological performance on neurocognitive measures described in Hypothesis 2.

H4b: Changes in sleep parameters identified in Hypothesis 1 will correlate with increased capacity for memory suppression and cognitive/emotional control during an fMRI memory suppression task and will be associated with an enhancement of the prefrontal cortex/hippocampus activation ratio.

H4c: Changes in sleep parameters identified in Hypothesis 1 will correlate with changes in neurochemistry as outlined in Hypothesis 3e and 3f above.

3.C Sample Characteristics

Data collection for the project is complete. A total of N = 90 participants enrolled in the study and were randomly assigned to a light condition. Of those enrolled, 6 failed to complete the study, resulting in a final sample of ***N* = 84 (BLT: *n* = 44; ALT *n* = 40)**. Two of these participants also were completing their participation at the outset of the COVID-19 pandemic, so it was not possible to collect all in-person data from those individuals due to institutional COVID mitigation measures in place at that time. Below are the Inclusion and Exclusion Criteria:

Inclusion Criteria:

1. Age 18-50 years;
2. Right handedness, as assessed by the Edinburgh Handedness Inventory (EHS);
3. A diagnosis consistent with PTSD based on the Structured Clinical Interview for DSM-V (SCID-V). The "*index trauma*" is defined as the traumatic event that leads to the current diagnosis of PTSD.

Exclusion Criteria:

4. History of head injury with loss of consciousness for greater than 30 minutes, or post-traumatic amnesia for >24 hours, or major neurological illness (e.g., epilepsy, multiple sclerosis/MS);
5. Chronic medical (e.g., heart conditions, cystic fibrosis, diabetes, cancer, HIV/AIDS, HEP C, thyroid problems, high blood sugar) or psychiatric (e.g., bipolar disorder/manic or hypomanic episodes, personality disorders, schizophrenia/other psychotic disorders, severe OCD or ADHD) conditions that would confound interpretation of results;
6. Left-handedness or left-hand dominance if ambidextrous (could affect brain lateralization and add error variance to scanning);
7. Abnormal visual acuity that cannot be corrected by contact lenses (necessary to see stimuli in the magnetic environment of the scanner);
8. IQ estimate less than 70;

9. Metal within the body, pregnancy, or other contraindication for MRI procedures;
10. Ongoing trauma (e.g., currently being in an abusive relationship) or non-qualifying trauma (e.g., index trauma emotional/verbal abuse, children being taken away by the CPS, divorce, natural deaths by age or illness);
11. Previous formal treatment with light therapy;
12. History of light-induced migraine or epilepsy; medical complications that could elevate the risk of discomfort associated with light-therapy;
13. Use of medications that could affect functional neuroimaging results (e.g., beta-blockers, mood stabilizers, atypical antipsychotics, benzodiazepines, hypertension medication, chemotherapy, photosensitive medications, etc.). Patients currently taking other psychotropic medications (i.e., "treatment as usual") must be stabilized for at least 4-weeks prior to participation. Although participants will not be excluded from participation, detailed history and dosages will be documented and examined as appropriate in statistical analyses.
14. Current suicidal intent based on an assessment conducted by a licensed clinical psychologist;
15. Currently taking or anticipating the need to take sleep-inducing medications (e.g., zolpidem) or supplements that have known effects on sleep (e.g., melatonin) during the course of the study. Patients currently taking other psychotropic medications (i.e., "treatment as usual") must be stabilized for at least 4-weeks prior to participation. Although participants will not be excluded from participation, detailed history and dosages will be documented and examined as appropriate in statistical analyses. Due to the broad range of sleeping disturbances that are observed with PTSD and the likely difficulty in recruiting sufficient numbers of participants, we will not be excluding any particular sleep disorder, but will collect data regarding these sleep related problems so that it may be possible to statistically control for the effect of the BLT treatment on different forms of sleep problems;
16. Index trauma occurring before the participant is 18 years of age;
17. Index trauma occurring 10 years or longer prior to participation in the study;
18. WRAT4 reading test score indicative of less than a 6^{th} grade level of reading comprehension;
19. Drug use: Marijuana use not exclusionary. Past drug dependence (other than marijuana) not exclusionary if individuals have sustained remission (no drug use in the past 12 months).

Participant Selection Procedures:

Advertisements were placed within the local Tucson and surrounding metropolitan areas. Advertisement occured through posted flyers, radio advertisements, and various internet ad campaigns. Interested participants contacted the investigators by registering on our laboratory webpage and were then contacted by a trained research assistant by phone. During the phone call, participants were given a full description of the study, had the opportunity to ask questions. Eligible participants were then invited to attend an in-person visit to determine PTSD eligibility (Visit 1). Prior to undergoing the clinical assessment, all interested individuals were again briefed on the study and provided written informed consent. Participants were then evaluated for PTSD severity using the Structured Clinical Interview for DSM-V (SCID). Research Technicians who have been trained and meet predetermined qualifications to administer a Structured Clinical Interview by doctoral level clinical psychologists with training and experience with these instruments will administer the SCID. All SCID administrations will be reviewed via supervision by a qualified doctoral level clinical psychologist immediately following the participant's interview. Participants were required to meet DSM-V criteria for PTSD at a clinical to subclinical severity. Out of the 84 participants who completed the study, 79 met clinically significant criteria for PTSD on the SCID-V, while 5 were just below the threshold and were listed as "sub-clinical" (BLT $n = 2$; ALT $n = 3$). The proportion of clinical to sub-clinical participants between BLT and ALT groups did not differ significantly ($\chi^2 = 0.08$, $p = .77$).

Baseline Demographics:

Basic demographic characteristics for the groups are reported in Table 1. ***N* = 84 (BLT: *n* = 44; ALT *n* = 40).** The ratio of males to females between the six groups did not differ significantly ($\chi^2 = 0.24$, $p = 0.88$). In addition, groups did not differ significantly on basic demographic variables including age ($t = -0.82$, $p = .42$), years of education ($t = -0.27$, $p = .79$), height ($t = 0.12$, $p = .90$), weight ($t = 0.72$, $p = .47$) or full-scale IQ as measured by the Wechsler Abbreviated Scale of Intelligence – 2nd Edition (WASI-II) ($t = 1.11$, $p = .27$). Similarly, the groups did not differ for age at index trauma ($t = -0.52$, $p = .60$) or for years since the index trauma ($t = -.73$, $p = .23$). *Thus, the data suggest that the two light condition groups did not differ in basic demographics at baseline.*

Table 1. Baseline Demographic characteristics

Baseline Demographics	Blue (active) n = 44		Amber (placebo) n = 40		
	M	SD	M	SD	p-value
Age	31.70	8.76	30.15	8.70	.42
Education Category	4.91	1.61	4.82	1.50	.79
Height (inches)	66.92	3.89	67.03	3.92	.90
Weight (pounds)	170.95	45.54	177.98	42.97	.47
Full Scale IQ	100.41	11.42	103.43	13.43	.27
Age at Index Trauma	27.97	8.46	27.01	8.24	.60
Years since Index Trauma	3.39	2.18	3.03	2.18	.47
Male/Female (n)	15/29	--	13/27	--	.88

In addition to demographic information, all participants completed psychological questionnaires to assess depression, anxiety, PTSD symptoms, sleep problems, resilience, and life satisfaction. Summary statistics for baseline psychological characteristics are presented in Table 2. As evident in Table 2, none of the baseline psychological assessments were significantly different between the BLT and ALT groups. *This suggests that the two groups were adequately randomized and matched in terms of basic emotional and psychological characteristics at baseline entry into the study.*

Table 2. Baseline Psychological characteristics

Baseline Psychological Characteristics	Blue (active)		Amber (placebo)		
	M	SD	M	SD	p-value
Beck Depression Inventory (BDI)	25.59	12.09	21.93	10.48	.14
Patient Health Questionnaire (PHQ)	13.50	5.95	12.38	5.31	.36
Beck Anxiety Inventory (BAI)	20.16	11.80	19.27	12.32	.74
State-Trait Anxiety Inventory—State (STAI-S)	41.66	10.47	39.70	9.91	.38
State-Trait Anxiety Inventory—Trait (STAI-T)	55.36	10.69	52.77	9.30	.25
Alcohol Use Disorders Identification Test (AUDIT)	4.59	4.93	3.60	3.31	.29
Satisfaction With Life Scale (SWLS)	15.09	6.54	16.13	5.58	.45

Connor-Davidson Resilience Scale (CD-RISC)	60.70	15.95	59.15	15.12	.64
Insomnia Severity Index (ISI)	15.07	5.33	14.38	6.00	.58
Epworth Sleepiness Scale (ESS)	9.60	4.05	9.93	4.46	.73
Pittsburgh Sleep Quality Index (PSQI)	9.86	3.01	9.08	3.42	.29
Morningness/Eveningness (MEQ)	51.11	8.97	50.75	8.45	.85
Nightmare Severity Index (DDNSI)	13.68	5.71	14.62	4.66	.43
PTSD Symptom Checklist (PCL-5)	47.73	14.33	44.70	12.15	.30
CAPS Intrusion Symptoms	3.02	1.15	3.23	1.12	.42
CAPS Intrusion Severity	7.66	2.86	8.00	3.11	.60
CAPS Avoidance Symptoms	1.55	0.59	1.45	0.68	.49
CAPS Avoidance Severity	4.09	1.60	3.90	1.81	.61
CAPS Cognitive Symptoms	4.55	1.49	4.13	1.87	.26
CAPS Cognitive Severity	12.77	4.10	11.38	4.83	.16
CAPS Arousal Symptoms	3.91	1.14	3.73	1.20	.47
CAPS Arousal Severity	10.36	2.97	9.65	3.18	.29
CAPS Distress Symptoms	2.59	0.66	2.45	0.64	.32
CAPS Distress Severity	6.91	1.96	6.43	1.95	.26
CAPS Dissociative Symptoms	0.09	0.36	0.20	0.52	.26
CAPS Dissociative Severity	0.30	0.93	0.60	1.06	.16
CAPS Symptoms Total	35.07	8.28	32.90	9.84	.28
CAPS Severity Total	13.00	2.91	12.58	3.50	.55

3.D. Neuroimaging Data

Multimodal neuroimaging data were collected to examine structural integrity and functional connectivity in the brain before and after treatment with BLT versus ALT, as well as to explore the relationship between neurological measures and symptom outcomes. This report will provide findings from task-based functional magnetic resonance imaging (fMRI), resting-state functional connectivity (FC), diffusion tensor imaging (DTI), and voxel-based morphometry (VBM).

Data Collection: Neuroimaging data were collected using a 3T Siemens MAGNETOM Skyra using a 32-channel head coil. Head movement was restricted using foam cushions during all image acquisition. We collected a high-resolution anatomical T1-weighted (T1w) MPRAGE (TR/TE/flip angle = 2100 msec., 2.33 msec., 12°) that consisted of 176 slices (256 x 256 matrix) with a slice thickness of 1mm and voxel size of 1mm x 1mm x 1mm. Diffusion data were acquired along 72 directions with a b-value of 1000 s/mm^2 and the following parameters: voxel size = 2mm x 2mm x 2mm, TR = 9600 msec., TE = 88 msec., and 74 slices with a slice thickness = 2mm. Functional images were acquired using a gradient echo T2*-weighted sequence (TR/TE/flip angle = 2000 msec., 25 msec., 90°). Resting-state functional images were collected with 32 slices and a voxel size of 2.5mm x 2.5mm x 2.5mm, in an interleaved excitation order, with anterior-posterior phase encoding. During the collection of the resting state functional data, participants were instructed to remain awake but keep their eyes closed and let their "mind wander".

Image Processing: Neuroimaging data were processed using standard preprocessing pipelines. Functional MRI data were pre-processed using SPM12. DTI data were preprocessed using QSIPrep 0.13.0, which is based on Nipype 1.6.1. A detailed description QSIPrep pipeline can be found at https://qsiprep.readthedocs.io/en/latest.html. rsFC data were preprocessed using fMRIPrep 20.2.1. For a detailed description of the preprocessing pipeline used on the functional data, see

https://fmriprep.org/en/stable/workflows.html. Structural data for voxel-based morphometry were pre-processed with the CAT12 toolbox for SPM12. Specific imaging parameters are presented below.

D.I. Diffusion Tensor Imaging (DIT)

Anatomical data preprocessing

The T1w image was corrected for intensity non-uniformity using N4BiasFieldCorrection (Tustison et al. 2010) and subsequently used as the T1w-reference. The T1w-reference was then skull-stripped using antsBrainExtraction.sh (ANTs 2.3.1). Spatial normalization to the ICBM 152 Nonlinear Asymmetrical template version 2009c (Fonov et al. 2009) was performed through nonlinear registration with antsRegistration (Avants et al. 2008), using brain-extracted versions of both T1w volume and template. Brain tissue segmentation of cerebrospinal fluid (CSF), white-matter (WM), and gray-matter (GM) were performed on the brain-extracted T1w using FAST (FSL 6.0.3; Zhang, Brady, and Smith 2001).

Diffusion data preprocessing

Several confounding time-series were calculated based on the preprocessed DWI: framewise displacement (FD) using the implementation in Nipype. The head-motion estimates calculated in the correction step were also placed within the corresponding confounds file. Slice-wise cross correlation was also calculated. The DWI time-series were resampled to AC-PC orientation, generating a preprocessed DWI run in AC-PC space. The FMRIB Diffusion Toolbox was used for brain extraction (Smith, 2002) and fitting of the diffusion tensor model (DTIFIT), which calculates fractional anisotropy (FA) and mean diffusivity (MD) and provides outputs for the calculation of axial diffusivity ($AD = \lambda_1$) and radial diffusivity ($RD = [\lambda_2 + \lambda_3]/2$).

Tract Based Spatial Statistics (TBSS)

Voxel-wise statistical analysis of FA data was carried out using TBSS (Tract-Based Spatial Statistics, [Smith 2006]), part of FSL [Smith 2004]. First, FA images were created by fitting a tensor model to the raw diffusion data using FDT, and then brain-extracted using BET [Smith 2002]. A study specific T1 template was created from preprocessed T1w images using antsMultivariateTemplateConstruction2.sh, which produced warps from the T1w image to the study T1 template for each subject. All subjects' FA data were then aligned to a study specific template using the nonlinear registration tool FNIRT [Andersson 2007a, 2007b], which uses a b-spline representation of the registration warp field [Rueckert 1999]. Next, the mean FA image was created and thinned to create a mean FA skeleton which represents the center of all tracts. Each subject's aligned FA data was then projected onto the skeletonized image and resulting data fed into voxel-wise cross-subject statistics, for whole-brain analyses.

D.II Resting State Functional Connectivity (FC)

Anatomical data preprocessing

The T1-weighted (T1w) image was corrected for intensity non-uniformity with N4BiasFieldCorrection (Tustison et al. 2010), distributed with ANTs 2.3.3 (Avants et al. 2008), and used as the T1w-reference. The T1w-reference was then skull-stripped with a *Nipype* implementation of the antsBrainExtraction.sh (ANTs). Brain tissue segmentation of cerebrospinal fluid, white-matter, and gray-matter was performed on the brain-extracted T1w image using fast (FSL 5.0.9; Zhang, Brady, and Smith 2001). Next, brain surfaces were reconstructed using recon-all (FreeSurfer 6.0.1; Dale, Fischl, and Sereno 1999). Finally,

volume-based spatial normalization to standard, MNI space was performed through nonlinear registration with antsRegistration, using brain-extracted versions of both T1w-reference and the T1w template.

Functional data preprocessing

For the resting state BOLD run, the following preprocessing was performed. First, a reference volume and its skull-stripped version were generated using a custom methodology of *fMRIPrep*. The BOLD reference was co-registered to the T1w-reference image using bbregister (FreeSurfer). Head-motion parameters (transformation matrices, and six corresponding rotation and translation parameters) were estimated before spatiotemporal filtering using mcflirt (FSL 5.0.9; Jenkinson et al. 2002). The BOLD run was then slice-time corrected and resampled into standard MNI space (MNI152NLin2009cAsym, MNI152NLin6Asym). Automatic removal of motion artifacts using independent component analysis (ICA-AROMA, Pruim et al. 2015) was performed on the preprocessed BOLD in MNI space time-series after removal of non-steady state volumes and spatial smoothing with an isotropic, Gaussian kernel of 6mm FWHM (full-width half-maximum). Several confounding time-series were calculated including, framewise displacement, DVARS, and three region-wise global signals. The three global signals are extracted within the CSF, the WM, and the whole-brain masks. Additionally, a set of physiological regressors were extracted to allow for component-based noise correction (*CompCor*, Behzadi et al. 2007). Principal components are estimated after high-pass filtering the preprocessed BOLD time-series for the two *CompCor* variants: temporal (tCompCor) and anatomical (aCompCor). tCompCor components are then calculated from the top 2% variable voxels within the brain mask. For aCompCor, three probabilistic masks (CSF, WM and combined CSF+WM) are generated in anatomical space. Finally, these masks are resampled into BOLD space and binarized by thresholding at 0.99. The head-motion estimates calculated in the correction step were also placed in the corresponding confounds file. Frames that exceeded a threshold of 0.5 mm FD or 1.5 standardized DVARS were annotated as motion outliers.

Functional connectivity: CONN

Post-processing and functional connectivity estimations from the preprocessed BOLD time series was accomplished for each subject using CONN (v.20.b.; https://web.conn-toolbox.org). Functional smoothing utilizing spatial convolution with a Gaussian kernel was applied to functional volumes, as an additional preprocessing step. The default denoising pipeline in CONN was implemented, which combines linear regression of potential confounding effects in the BOLD signal, and temporal band-pass filtering. Confound regressors from fMRIPrep were entered including 1) noise components from WM and CSF, 2) estimated subject motion parameters, and 3) outlier scans. Temporal band-pass filtering was implemented using a discrete cosine transformation windowing operation to remove frequencies below 0.008 Hz or above 0.09 Hz from the BOLD signal. Following denoising, individual subject seed-to-voxel whole-brain connectivity maps were calculated with the mean time series from each seed used as a predictor in a general linear model (GLM). The resulting individual bivariate correlation coefficients were Fisher transformed into z-scores for subsequent second-level analysis. Seed-to-voxel analyses were performed by extracting the BOLD time-series from ROIs placed in frontal areas (Frontal_Mid, Frontal_Sup_Orb, Frontal_Sup_Med, Rectus, ACC_Sub) and amygdala regions as defined by the Automated Anatomical Labeling Atlas 3 (AAL3) (Rolls, Huang, Lin, Feng, & Joliot, 2020), while ROI-to-ROI analyses were performed with functional network based ROIs as defined from CONN's ICA analyses of 497 subjects using classical networks and anatomical regions defined by the AAL3. Pearson correlation coefficients between the time course of all the voxels within each seed region were computed for entry into subsequent second-level analyses.

Tractography (DSI Studio)

A total of 145 diffusion MRI scans were included in the connectometry database. A DTI diffusion scheme was used, and a total of 72 diffusion sampling directions were acquired. The b-value was 1000 s/mm2. The in-plane resolution was 1 mm. The slice thickness was 1 mm. The b-table was checked by an automatic quality control routine to ensure its accuracy (Schilling et al. MRI, 2019). The diffusion data were reconstructed in the MNI space using q-space diffeomorphic reconstruction (Yeh et al., Neuroimage, 58(1):91-9, 2011) to obtain the spin distribution function (Yeh et al., IEEE TMI, ;29(9):1626-35, 2010). A diffusion sampling length ratio of 1.25 was used. The output resolution is 1 mm isotropic. The restricted diffusion was quantified using restricted diffusion imaging (Yeh et al., MRM, 77:603–612 (2017)). The quantitative anisotropy was extracted as the local connectome fingerprint (LCF, Yeh et al. PLoS Comput Biol 12(11): e1005203) and used in the connectometry analysis. A deterministic fiber tracking algorithm (Yeh et al., PLoS ONE 8(11): e80713, 2013) was used with augmented tracking strategies (Yeh, Neuroimage, 2020) to improve reproducibility.

The seven seed regions outlined above (mPFC, LPFC L, LPFC R, ACC, PCC, LP L, and LP R) were placed as seeding regions for fiber tracking. Outcomes from seed-to-voxel functional connectivity analyses were then imported to DSI Studio and used as end regions for fiber tracking. Standard parameters included: anisotropy threshold randomly selected, change threshold was 20%, angular threshold was randomly selected from 15 degrees to 90 degrees. The step size was randomly selected from 0.5 voxel to 1.5 voxels. Tracks with length shorter than 15 or longer than 150 mm were discarded. A total of 500000 seeds were placed.

D.III Voxel Based Morphometry

The proposed project did not specify structural gray matter correlates of time-since-injury (TSI). However, our standard anatomical neuroimaging data collection included T1-weighted structural images. Therefore, it was possible to also examine gray matter volume differences between groups as part of exploratory analyses. These were pre-processed in SPM12 using CAT12. Because those analyses were not part of the initial project proposal, we will present such data separately in the Supplementary Analyses section at the end of the discussion of the primary hypothesized analyses.

3.E. Neuropsychological/Behavioral Data Collection and Formal Reduction

As shown in Table 3, each participant completed a comprehensive assessment battery that included PTSD symptoms and severity, psychological and emotional functioning, wellbeing, neuropsychological status, intellectual capacity, fear conditioning and extinction, assessment of in-lab daytime sleep onset latency, and at home sleep parameters using wrist actigraphy.

Table 3. List of Primary Assessments in the Protocol

Assessment	What it measures
Structured Clinical Interview for the DSM-5 (SCID)	Determines if the participant meets criteria for DSM-5 diagnoses. Used in this study as a screening measure to ensure that PTSD criteria are met, and to ensure that criteria are *not* met for exclusionary disorders (e.g. bipolar, schizophrenia).
Edinburgh Handedness Scale (EHS)	Determines laterality quotient (LQ) which ranges from -100 (indicates extreme left-hand preference) to 100 (indicates extreme right-hand preference). Also determines decile rank of

	handedness (e.g. 1^{st}-10^{th} decile left or 1^{st}-10^{th} decile right)
Combat Exposure Scale (CES)	Determines degree of exposure to combat (e.g. number of times the participant was surrounded by the enemy)
Trauma History Screen (THS)	Collects qualitative details of the trauma and participant's reaction to the trauma. A basic descriptor of the trauma (e.g. "a really bad car, boat, train, or airplane accident"), age at trauma, number of times the trauma happened, emotional reaction to the event, duration of distress, degree of distress attributable to the trauma.
Morningness-Eveningness Questionnaire (MEQ)	Measures timing of peak alertness (morning, evening, or in between). Composite score denotes degree of preference for morning.
Alcohol Use Disorders Identification Test (AUDIT)	Detects hazardous alcohol use. A score of 8 or more is indicative of hazardous alcohol use.
Rivermead Post Concussion Symptoms Questionnaire (RPCSQ)	Examines presence and severity of symptoms (e.g. headache, dizziness) via self-report.
Marijuana Use Questionnaire (MUSE)	Measure of recent marijuana use.
Wide Range Achievement Test - 4 (WRAT-4)	Measures reading skills, used as a screening measure to ensure English proficiency. Only the reading skills section was administered.
Wechsler Abbreviated Scale of Intelligence - 2 (WASI-2)	Measures IQ. All four subsections were administered. Used as a screening measure.
Beck Anxiety Inventory (BAI)	Measures severity of anxiety.
Beck Depression Inventory 2 (BDI-2)	Measures severity of depression symptoms.
Evaluation of Risks Scale (EVAR)	Assesses risk-taking propensity.
State-Trait Anxiety Inventory (STAI)	Assesses state-level and trait-level anxiety.
Day of Scan Questionnaire (DSIQ)	A collection of questions relating to demographics, caffeine, alcohol/nicotine use, exercise, appetite, general self-report sleep metrics ("Do you ever have trouble falling asleep? How often per week, month, or year?").
Stanford Sleepiness Scale (SSS)	Measures current sleepiness.
Therapy Questionnaire	Collects information about past and current treatments the participant has undergone for their PTSD. Disambiguates which type of therapy, start date, end date, frequency of therapy, and current involvement in the therapy.
Satisfaction with Life Scale (SWLS)	Current satisfaction with life.
Connor-Davidson Resilience Scale (CD-RISC)	Assesses resilience.
PTSD Checklist for DSM-5 (PCL-5)	Current PTSD symptom severity.
Insomnia Severity Index (ISI)	Current insomnia severity.
Pittsburgh Sleep Quality Index (PSQI)	Sleep habits and sleep quality in the past month.
Patient Health Questionnaire-9 items (PHQ-9)	Measures depression symptoms.
Disturbing Dreams and Nightmares Severity Index (DDNSI)	Measures frequency and severity of nightmares.
Functional Outcomes of Sleep Questionnaire (FOSQ)	Measures degree of impact of sleep loss on daily functioning.

Gratitude Questionnaire-6 items (GQ-6)	Measures gratitude in daily life.
Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)	Assesses PTSD symptoms in the past month.
Treatment Perception Questionnaire	Assesses participant's perception of which condition they received, and how certain they are of their perception.
Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)	Assesses immediate memory, delayed memory, visuospatial reasoning, language, and global neuropsychological functioning.
Epworth Sleepiness Scale (ESS)	Assesses daytime sleepiness.

E.I Fear Conditioning

During the baseline visit, participants underwent a well-validated fear conditioning protocol (Milad et al., 2009; Pace-Schott et al., 2009) (Marin et al., 2017). Specifically, the participant is first conditioned to fear a particular stimulus (e.g., a blue or red or yellow vehicle) in a specific context (e.g., city street in Baghdad) by providing a mild electric shock when the conditioned stimuli are shown, as shown in panel A of Figure 8 below. A third stimulus (e.g., yellow bus) is never paired with the electric shock and serves as a "non-conditioned cue" or CS-. Participants were randomized across 8 different stimulus/context conditions, counterbalancing vehicle color and conditions across CS conditions and presentation contexts, as well. Our participants showed a rapid acquisition of the conditioned fear response for the conditioned stimulus (e.g., red and blue vehicles), as evidenced by increased skin conductance and/or self-report indicating they expected a shock by the last two stimulus presentations during conditioning for CS+. Next, as shown in Panel B of Figure 8 below, the goal is to extinguish one conditioned stimulus (i.e., blue truck) by repeatedly showing the stimuli in a novel context (e.g., a dirt road in Afghanistan), but without any electric shock administered. After 16 trials where the stimuli are shown without any further shock, the skin conductance response of the blue truck returns to normal. Thus, at this phase of the task, the fear response to the blue truck has been successfully "extinguished" by the creation of a new "safety memory". However, the red vehicle, which was previously paired with the electric shock, is never shown again in this new context, so it retains the saliency of the initial conditioned fear response. The yellow bus was never paired with a shock, so it will continue to evoke very little skin conductance response. After 6-weeks of light exposure therapy (BLUE or AMBER), participants returned to the lab and were shown the same stimuli again, without any new shock stimuli to assess the degree the safety memory was consolidated subsequent to extinguishing (see Panel C in Figure 3.7 below).

Skin-conductance monitoring

SCL was continuously monitored at 37.5 Hz using disposable, MRI-safe 11-mm, Ag/AgCl sensors filled with isotonic paste attached 14 mm apart on the hypothenar surface of the left hand and recorded using the MP150 system and with *Acqknowledge* (BIOPAC Systems, Inc., Goleta, CA). Skin conductance response (SCR) was calculated for each trial as the mean skin conductance level in microSiemens (μS) during the last 2 seconds of context presentation, subtracted from the maximum skin conductance level during the 6 seconds of CS presentation. SCRs were square-root transformed; if the untransformed SCR was negative, the negative sign was retained after calculating the square root of the SCR's absolute value (Orr et al., 2000). "Non-conditioners" were defined as those who exhibited less than 2 non-square-root transformed SCR responses to a CS+ that equal to or exceeding 0.05 μS during the Fear Conditioning phase. Non-conditioners, 8 Blue and 6 Amber, were excluded from analyses.

Outcome variables included SCR and differential SCR (dSCR) equal to SCR to a CS+ minus SCR to its ordinally corresponding CS-. Summary variables for the Fear Conditioning phase included a measure of

differential "Conditionability" that was defined as the mean SCRd to all CS+s (excluding the first to each CS+). For the Extinction Learning phase, an Extinction Learning index (EXTidx) was defined. EXTidx was calculated by subtracting mean SCR to the last four CS+E presentations from mean SCR to the first four CS+E presentations, dividing this value by the Maximum Conditioning CR, and multiplying by 100.

The degree of extinction recall was represented by the Extinction Recall Index (ERI) (Milad, Wright, et al., 2007) calculated as follows: First, the mean SCR to the first four CS+Es presented during the Extinction Recall phase were divided by the Maximum Conditioning CR and multiplied by 100 thereby representing the percent of conditioned fear that had been retained. ERI was then computed as 100% minus this percent fear retention. A larger ERI thus represented greater extinction recall.

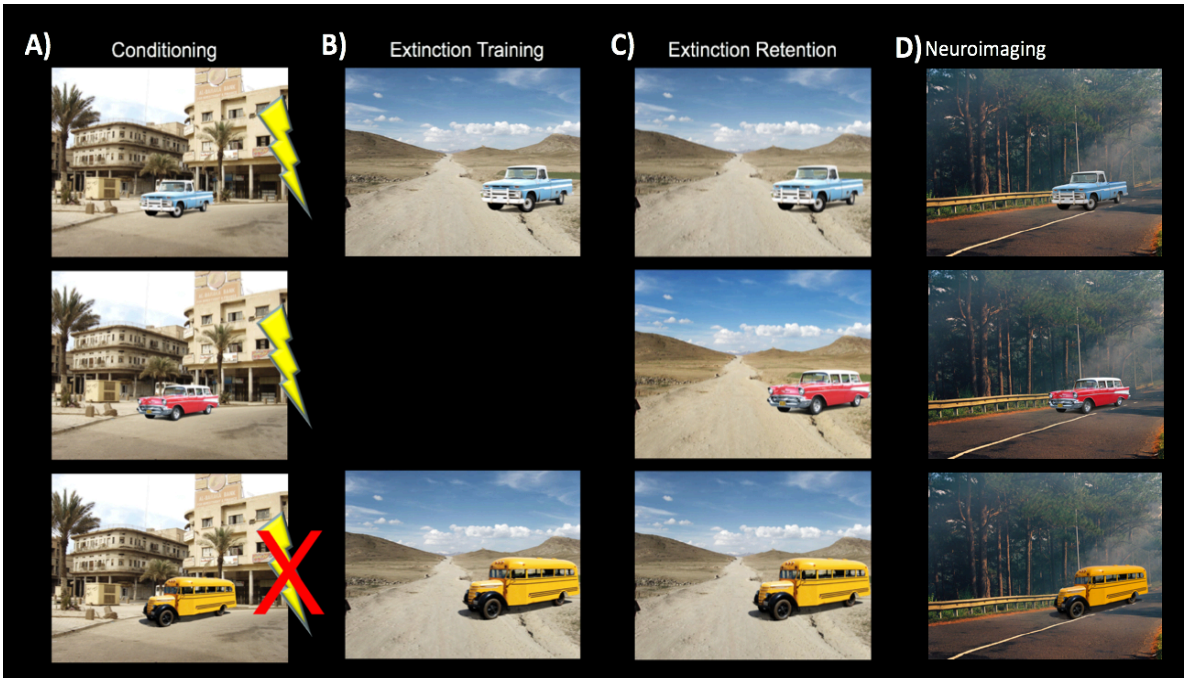


Figure 3.7 Overview of the modified fear-conditioning/fear-extinction protocol. A) at baseline, participants were conditioned to fear two of three stimuli (i.e., blue truck and red car) by a mild but not painful electric shock (Milad et al., 2009), and skin conductance was measured. B) On the same day, participants underwent extinction of the blue truck, but not the red car. Extinction was demonstrated by a reduction in skin conductance. C) After six weeks of morning light treatment (blue or amber), participants returned to the lab and were shown the same stimuli again and skin conductance was measured. D) Participants were shown the same stimuli, in a different visual context, while undergoing functional magnetic resonance imaging (fMRI).

For extinction recall, a subjective extinction retention index (SubjERI) was calculated using the following formula: SubjERI = 100% – [(expectancy to the first 2 CS+E in Extinction Recall/mean expectancy for the last 2 of each CS+ during Fear Conditioning) x 100]. Thus, as for ERI, a larger SubjERI indicated greater extinction recall. For subjective shock expectancy analyses, Trial was replaced with a "Time Point" variable (first 2 presentations and last 2 presentations).

3.F. Key Outcomes Related to the Specific Aims and Hypotheses

The proposed project included three Specific Aims comprising 14 hypotheses. In the sections below, each aim will be presented. Subsumed within each Specific Aim, the associated hypotheses will be presented along with the corresponding specific statistical analyses and results.

SPECIFIC AIM 1: Evidence suggests that morning bright light therapy suppresses daytime melatonin and leads to an entrainment of the circadian rhythm that modulates daytime alertness and nighttime sleep. The first aim was to assess the validity of this effect in PTSD patients.

Hypothesis 1a: Six weeks of morning blue light therapy (BLT) will improve objective and subjective measures of sleep duration and quality as measured by actigraphy, sleep logs, sleep scales, and polysomnography relative to an amber light placebo therapy (ALT) condition.

Effects of Blue Light Therapy on Sleep: One of the major goals of the study was to determine the effects of blue light therapy (BLT) on sleep. We hypothesized that six weeks of morning blue light therapy would improve both subjective and objective sleep relative to an amber light placebo treatment (ALT.)

To assess subjective sleep, participants completed several self-reported scales at baseline and following treatment. These scales included the Pittsburg Sleep Quality Index (PSQI), the Insomnia Severity Index (ISI), and the Epworth Sleepiness Scale (ESS). Objective sleep was captured through actigraphy. During the one-week screening period and the six-week bright light treatment period, participants wore wrist actigraphs (Actiwatch Spectrum Pro®, Philips) that provided objective measurements of their sleep. In particular, the actigraph devices tracked data on sleep timing variables, such as bedtime and waketime, sleep duration variables such as time in bed and total sleep time (TST), and sleep continuity variables, such as sleep onset latency (SOL), wake after sleep onset (WASO), and sleep efficiency (SE). They also provided information about daytime napping, including the number and length of the nap. At the same time, participants completed sleep diaries in which they reported converging information, such as when they fell asleep and when they woke up (TST), how long it took them to fall asleep (SOL), and how many times they awoke during the night (WASO). In addition, participants reported whether they experience nightmares and how well-rested they felt in the morning.

Subjective Sleep: Changes in subjective sleep were analyzed using a 2 (BLT, ALT) x 2 (Baseline, Post-tx) repeated measures ANOVA. Results showed that subjective sleep tended to improve between baseline and post-treatment. However, this improvement was not qualified by significant interaction gin both the amber and blue light groups reported lower PSQI scores (indicating fewer symptoms of disrupted sleep), $F(1, 74) = 24.51$, $p < .001$, $\eta_p^2 = .25$. Both groups also reported lower levels of insomnia severity, $F(1, 79) = 40.90$, $p < .001$, $\eta_p^2 = .34$, and daytime sleepiness, $F(1, 77) = 5.13$, $p = .26$, $\eta_p^2 = .06$. None of the group x time interactions were significant, $ps > .530$, see Figure 3.8.

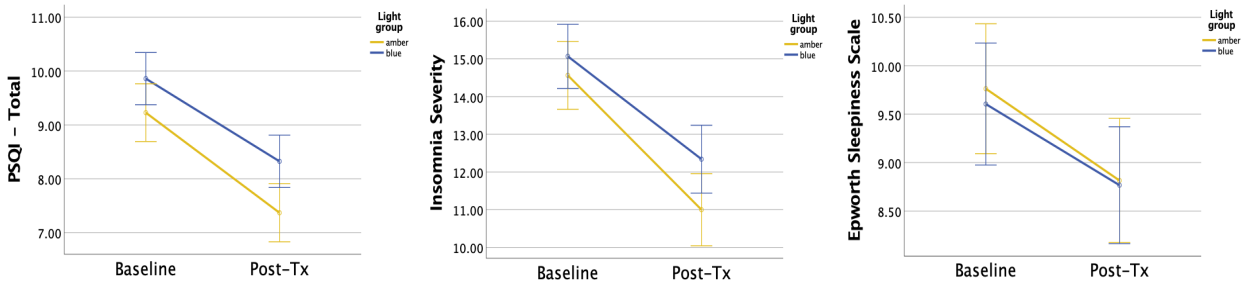


Figure 3.8. Improvements in sleep quality, insomnia severity, and daytime sleepiness as a function of time. There were no significant interactions between light group and time.

Objective Sleep: Participants wore an actigraphic watch to provide an objective metric of sleep based on standard algorithms as assessed by the Actiware® program. Participants were excluded from the analyses if they had fewer than 2 weeks of actigraphy data (n = 6). The included participants (n = 77) had an average of 46.96 nights of actigraphy assessed sleep. Objective sleep was analyzed using multilevel modelling (MLM), in which nights were nested within individuals. Such procedures account for the non-independence of the data, are robust to missing data, and can capture both the fixed and varying effects of means and trajectories.

The present analyses focused on linear level 2 (between-subjects) main effect models of light condition predicting sleep outcomes, with both intercepts and slopes allowed to vary. Preliminary examinations of null models revealed that the majority of the variance in objective sleep outcomes tended to be accounted for by within-person factors, rather than between subject factors. Moreover, graphical examinations of the raw data revealed considerable within-person fluctuations across days, rather than clear linear patterns. However, there were still some linear trends of light condition x time that emerged. Light condition was associated with trajectories of sleep duration. There were significant group x time interactions for both time in bed, t = 2.80, p = .006, B = .73, and total sleep time, t = 2.38, p = .019, B = .52. Figure 3.9 displays the estimated means for this interaction and shows cross-over interactions such that individuals in the blue light condition tended to experience an increase in sleep duration whereas individuals in the amber light condition tended to experience a decrease. *Thus, BLT significantly increased time in bed and total sleep time relative to the ALT placebo condition.*

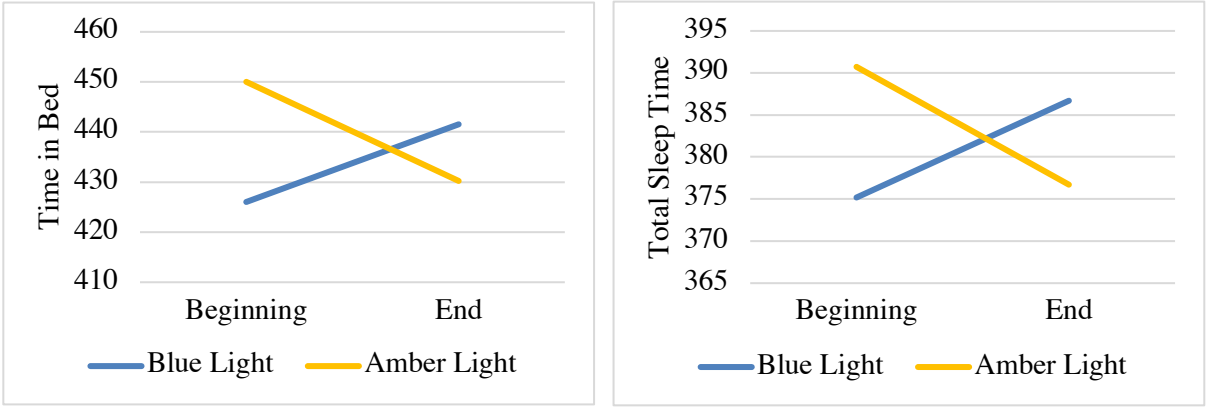


Figure 3.9. Improvements in sleep quality, insomnia severity, and daytime sleepiness as a function of time. There were no significant interactions between light group and time.

In addition, we found significant group x time interactions for bedtime, t = -2.31, p = .024, B = -.71, wake after sleep onset (WASO), t = 2.30, p = .024, B = .19, and sleep efficiency (SE), t = -2.30, p = .022, B = -.03., see Figure 3.10. For bedtime, the interaction was such that individuals in the blue light condition had much later bedtimes at the beginning of the actigraphy period and demonstrated a slight shift to earlier bedtimes across the 7-week period. Individuals in the amber light condition started lower and shifted to later bedtimes. Although the trajectories were in the hypothesized direction, there were no significant differences between groups in terms of bedtime by the end of the actigraphy phase of the study. For WASO, individuals in the amber condition demonstrated greater improvements in WASO, whereas individual in the blue light condition showed little change in WASO over time, which is contrary to what we expected. The same pattern was true for SE. Again, the two conditions did not differ significantly by the end of the actigraphy phase of the study. It is important to consider that the calculation of SE is calculated by dividing TST by TIB to derive a percentage of time in bed that was spent asleep. In this case, both TST and TIB increased. By increasing the total TIB (the denominator), the SE would be

expected to be somewhat adversely affected. Finally, we did not find a significant interaction between group x time predicting SOL, t = -.72, p = .471, B = -.02, Waketime, t = .28, p = .777, B = .08, sleep midpoint, t = -1.39, p = .164, B = -.32, or likelihood of taking a nap, t = -.97, p = .330.

Thus, while TIB and TST were significantly improved by BLT relative to ALT, individual components of actigraphic sleep, such as WASO and SE, did not show the expected patterns.

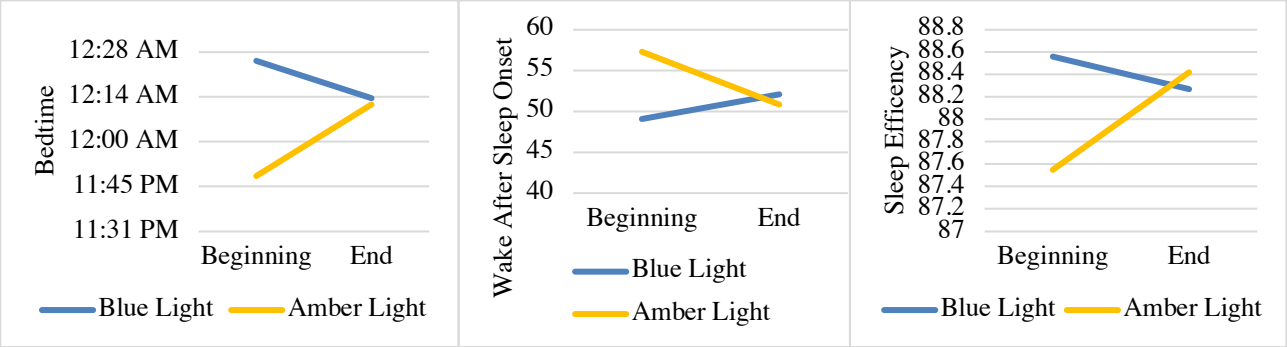


Figure 3.10. Estimated means for changes between the start (i.e., day 1) and end (i.e., day 49) of actigraphy assessed sleep period for bedtime and WASO as a function of light condition and time.

Sleep diaries: Participants completed an average of 38.63 (SD = 4.85) sleep diaries during the 7-week actigraphy phase of the study. Participant sleep diaries correlated with actigraphy-measured sleep for wake time (r = .80), bedtime (r = .74), time in bed (r = .60), and total sleep time (r = .60). However, participant sleep diaries did not correlate with actigraphy-assessed sleep onset latency (r = .08). This is consistent with much evidence that suggests that individuals are not reliable at assessing their own sleep onset latencies. Wake after sleep onset was weakly correlated (r = .23), perhaps from a similar lack of insight into the number and length of nighttime awakenings.

Using similar MLM procedures, we found significant group x time interaction for total sleep time, t = 2.21, p = .028, B = .56, and WASO, t = 3.21, p = .001, B = .23. These interaction patterns were similar to what was found using objective actigraphy assessed sleep. Using the sleep diary data, there were not significant interactions predicting time in bed, t = 1.06, p = .289, B = .27, bedtime, t = -1.40, p = .161, B = -.33, Sleep onset latency, t = -1.69, p = .092, B = -.14, likelihood of having a nightmare, t = 1.76, p = .078, or feeling fatigued, t = -1.11, p = .267, B = -.002.

Summary: The findings clearly show that BLT was more effective than ALT at increasing time in bed, overall total sleep time, and shifting individuals to an earlier bedtime. Individuals in the blue light treatment condition did experience improvements in subjective sleep, but individuals in the amber light placebo condition did as well, suggesting that there may be subjective improvements due to the regular schedule induced by using either device each morning. While The BLT group improved in TIB and TST, they also tended to experience declines in sleep quality (lower sleep efficiency and higher WASO), although this may be due, in part, to longer total time in bed. These findings raise several considerations as well. First, it raises the possibility that amber light may not be an inert placebo and may have had a positive effect on sleep. Future research may want to consider adding a no-light control for comparison purposes. Second, initial screening of the data revealed considerable within-person variation and fluctuating data rather than clear linear trends. Although some linear trends did emerge, future analyses may focus on identifying time-varying predictors and modeling these within-person fluctuations instead of focusing on linear trends.

Overall, these findings support the hypothesis and suggest that BLT was more effective than ALT at shifting individuals to an earlier bedtime, increasing total time in bed, and increasing total sleep time.

SPECIFIC AIM 2: If light therapy is successful in entraining the circadian rhythm and improving nighttime sleep in patients with PTSD, this should be associated with improvement in symptoms and cognitive functioning, as sleep has been shown to be critical in the process of extinguishing conditioned fears. Therefore, the second Aim was to evaluate the association between changes in sleep patterns and improvement in symptom expression, emotional wellbeing, and cognitive functioning in patients with PTSD. However, even if Aim 1 was not successful, we proposed that the present study will provide important cross-sectional data regarding the relationship between measured sleep, cognitive functioning, and fear extinction in individuals with PTSD.

Hypothesis 2a: Six weeks of BLT will improve measures of neurocognitive (i.e., memory and executive functions) and mood functioning relative to ALT.

Exposure to blue light has been shown to improve acute memory, and attention capacities, and therefore should be associated with improvements related to successful treatment outcomes. We hypothesized that individuals receiving the BLT treatment would show significant increases in both short-term and long-term memory, as well as improved attention relative to those in ALT condition. This hypothesis was tested, relative to main treatment effects, using a 2 (BL, ALT) x 2 (baseline, post-treatment) mixed ANOVA. Sex was also included as a covariate to account for theorized sex differences in symptomology. The heterogeneity of symptom presentations in PTSD is well documented, and the additional variables of interest were incorporated into post hoc linear mixed models and adjusted for multiplicity after the Holm-Bonferroni method. To analyze the effect of 3-way interactions, linear mixed models (estimated using REML and nloptwrap optimizer) were calculated for psychological outcome variables; to investigate interactions between treatment group, study phase, and potentially meaningful outcome measures. Dependent measures were log-transformed as necessary improve normality and meet model assumptions (verified via AIC-criteria model comparison); and participants were included in the model as a random effect. Standardized parameters were obtained by fitting the model on a standardized version of the dataset, with 95% Confidence Intervals (CIs) and p-values computed using the Wald approximation. Model. Results include Nakagawa's Psuedo-R^2 for marginal (only variances of the fixed components), as well as conditional (variance considered for both fixed and random effects). Analyses targeting interactions were performed using R (v4.1.0) with the lme4 package, and the report and sjtools packages were employed for model summarization. Variable clusters included demographics (age, sex, ethnicity), SCID assessment (trauma type [direct vs. indirect], the presence of comorbid mood/anxiety disorders), and sleep outcomes as measured by actigraphy. See Appendix C for full summaries of mixed models described below.

Main Study Effects

Neurocognitive Performance: Participants also completed the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) as a brief assessment of neurocognitive abilities. Participants showed improvements to immediate memory between baseline and post-treatment sessions, $F(1, 77) = 4.94$, $p = .029$, $\eta_p^2 = .06$, although once again, there was no group x time interaction, $F(1, 77) = .07$, $p = .786$, $\eta_p^2 = .002$. However, there was no difference in delayed memory, either as a function of time $F(1, 77) = .20$, $p = .659$, $\eta_p^2 = .003$, or as an interaction with group, $F(1, 77) = .70$, $p = .404$, $\eta_p^2 = .01$. There was similarly no differences in trained attention, either as a function of time: $F(1, 77) = .00$, $p = .973$, $\eta_p^2 = .00$, or as a group x time interaction, $F(1. 77) = .03$, $p = .860$, $\eta_p^2 = .00$, see Figure 3.11.

Thus, both light treatment conditions were associated with improvements in immediate memory, but no other effects were seen.

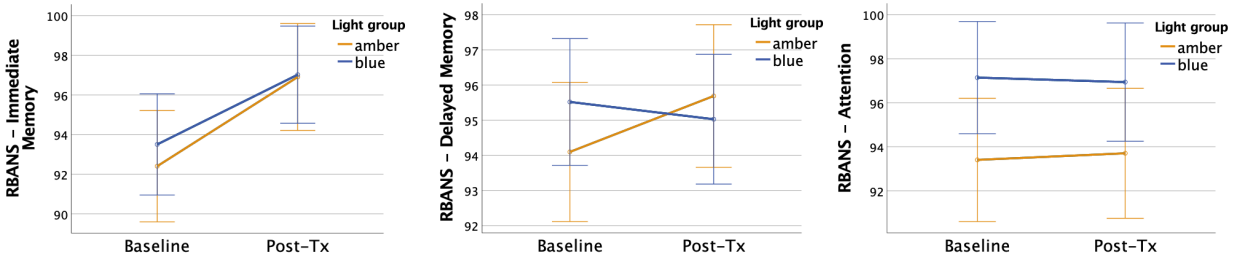


Figure 3.11. Changes to neurocognitive performance as a function of light condition and time

Well-Being: Participants reported improvements to their levels of well-being between baseline and post-training assessment sessions. Participants reported higher levels of satisfaction with life, $F(1, 76) = 39.44$, $p < .001$, $\eta_p^2 = .34$, and felt more resilient after the treatment, $F(1, 77) = 15.01$, $p < .001$, $\eta_p^2 = .16$. They also reported higher quality of life in terms of functional outcomes related to sleep, $F(1, 76) = 5.19$, $p = .026$, $\eta_p^2 = .06$. As shown in Figure 3.12, this was true regardless of group condition, $ps = .441$-$.880$. *Thus, engaging in either treatment was perceived as helpful for well-being but did not differ between light conditions.*

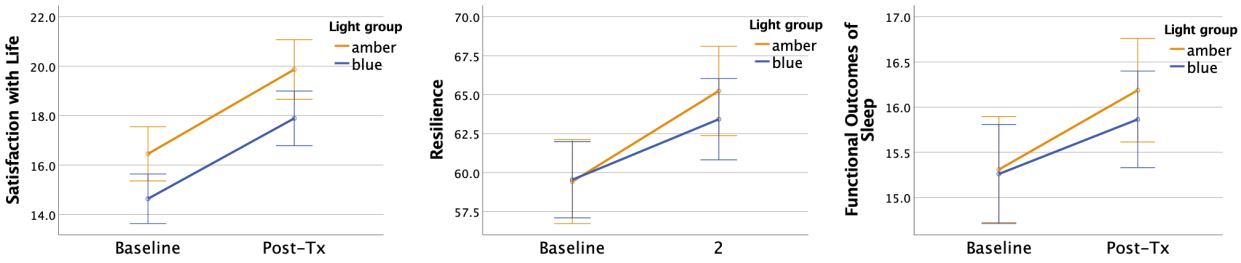


Figure 3.12. Improvements to satisfaction with life, resilience, and sleep-related quality of life as a function of light condition and time

Interaction Effects Related to Neurocognitive Performance, Study Phase, and Light Condition

We observed an interesting interaction between trauma exposure type (direct vs. indirect), with study phase and light condition. When incorporating exposure type into the mixed effects model, we observed a negative trend in the interaction effect on RBANS total score, (beta = -13.92, 95% CI [-23.75, -4.08], t(153) = -2.77, p = 0.006; Std. beta = -1.05, 95% CI [-1.79, -0.31]). As shown in Figure 3.13, subjects in the BLUE light condition that experienced a direct trauma had trending improvements in neurocognitive performance across the treatment phase, while those that experienced an indirect trauma had trending decreases in their total RBANS score relative to trending increases for individuals in the ALT. While the relationship remains unclear, the association between trauma exposure type and changes in neurocognitive performance should be investigated in future interventions.

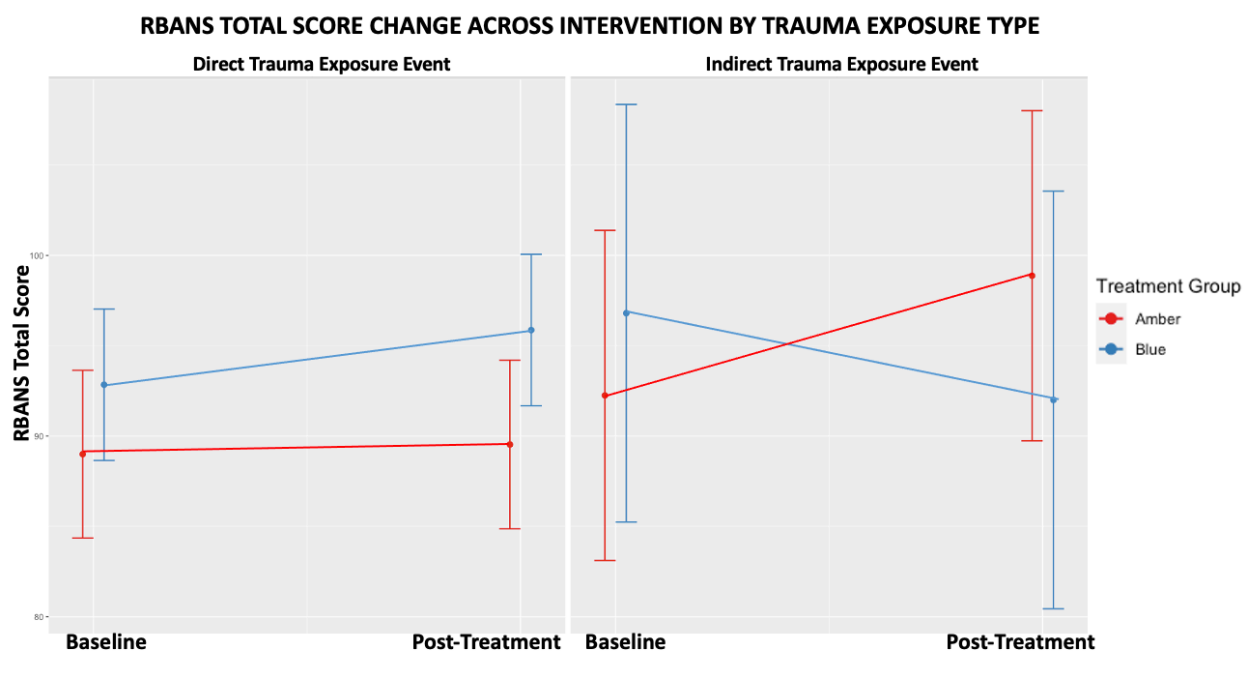


Figure 3.13. Improvements across time in RBANS total score as a function of light condition and trauma exposure type. Trends indicate differential effects of BLT on neurocognitive performance, with subjects in the BLT that experienced a direct trauma event demonstrating trending improvements in RBANS total score, as opposed to trending decreases in performance for individuals that experienced an indirect trauma event.

For the neurocognitive measures and mood metrics, these findings do not support Hypothesis 2a. While participants did report improvements in mood, these associations were not specific to the BLT condition. There were no associations observed for changes in memory or attention indices. These findings suggest that acute effects previously demonstrated for BLT on neurocognitive performance do not generalize across 6-weeks of daily morning BLT.

***Hypothesis 2b*: The PTSD group receiving six weeks of BLT will show a significant reduction in self-reported symptom scores on the PTSD symptom checklist and CAPS, lower emotional distress on clinical measures, and greater generalization of conditioned fear extinction relative to the PTSD group receiving ALT.**

Exposure to bright light has been shown to improve overall sleep quality, and therefore should be associated with improvements to mental health. We hypothesized that individuals receiving the blue light (BL) treatment would show significant reductions in symptoms and severity of PTSD, depression, and anxiety, as well as show significant improvements to well-being relative to those in the amber light placebo ALT condition. Similar to hypothesis 2a, this hypothesis was tested, relative to main treatment effects, using a 2 (BL, ALT) x 2 (baseline, post-treatment) mixed ANOVA. Sex was also included as a covariate to account for theorized sex differences in symptomology. Additional variables of interest were then incorporated into post hoc linear mixed models and adjusted for multiplicity to investigate the effect of 3-way interactions.

2b.1 Trauma Measures

Main Study Effects

Participants showed a decline in PSTD symptoms and severity between baseline and post-treatment assessments. There was a strong effect of time on both PTSD symptoms, $F(1, 76) = 120.95$, $p<.001$, $\eta_p^2 = .61$, and severity, $F(1, 76) = 104.53$, $p <.001$, $\eta_p^2 = .58$ as assessed by the Clinician-Administered PTSD Scale (CAPS-5). There was also a decrease in PTSD symptoms, as assessed by the PSTD checklist (PCL-5), $F(1, 77) = 74.08$, $p <.001$, $\eta_p^2 = .49$, see Figure 3.14. However, the effect of time was not qualified by a significant group x time interaction, *p*s = .408-.900. As shown in Figure 3.14, participants showed similar declines regardless of group condition.

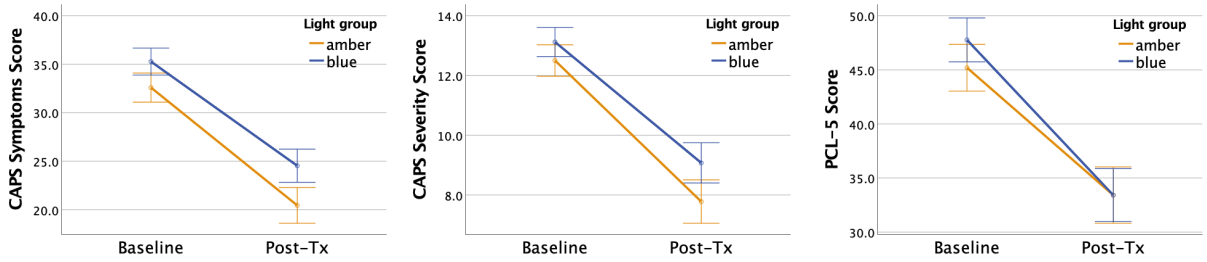


Figure 3.14 Improvements to PTSD symptoms and severity of as a function of light condition and time.

Interaction Effects Related to Trauma Symptoms, Study Phase, and Light Condition

We found that the interaction between study phase and light condition varied by sex. When incorporating sex into the mixed effects model, we found a significant interaction effect of group on study phase, (beta = -0.23, 95% CI [-0.46, -4.93e-03], t(153) = -2.00, p = 0.045; Std. beta = -0.46, 95% CI [-0.92, -9.94e-03]). This extended to a significant interaction effect of sex on study phase by group, (beta = 0.56, 95% CI [0.16, 0.97], t(153) = 2.73, p = 0.006; Std. beta = 1.14, 95% CI [0.32, 1.96]). As show in Figure 3.15, females in the BLUE light condition demonstrated significant reductions in trauma-based symptoms, as measured by the PCL-5, with no significant decreases for males or females in the AMBER condition observed. This resulted in a gross increase in the model's marginal $R^2 = 0.05$, as accounted for by the fixed effects.

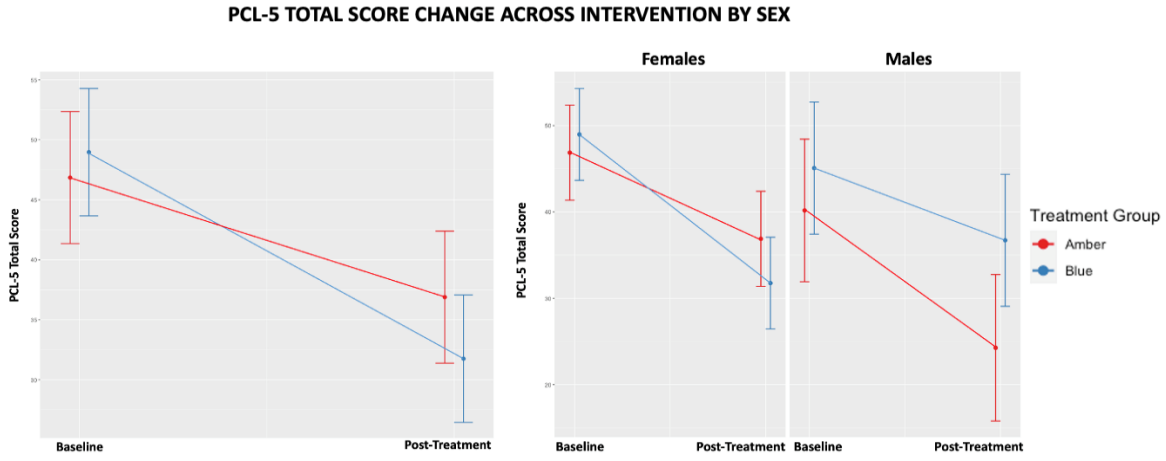


Figure 3.15. Improvements in PCL-5 scores by sex, as a function of light condition and time, are driven by females in the BLUE light condition. The plot on the left depicts the group by time interaction, while the plot on the left decomposes the 3-way interaction by sex.

Sleep Correlations with PTSD Symptoms

We examined the change in various sleep parameters from pre- to post-treatment and its correlation with changes in PTSD symptoms and severity during that same time frame. Difference scores on the Insomnia Severity Index (ISI) were calculated from pre- to post-treatment for each group and correlated with the difference scores from the Clinician Administered PTSD Scale (CAPS). As shown in Figure 3.16, for the BLT group, there was a significant correlation between changes in ISI scores and changes in CAPS symptoms (r = .515, p < .001), but this was not evident for the ALT group (r = -.126, p = .47). Similarly, the BLT group showed a significant positive association between the change in ISI and the change in severity of CAPS symptoms (r = .471, p = .002), but this was not found for the ALT group (r = -.026, p = .883).

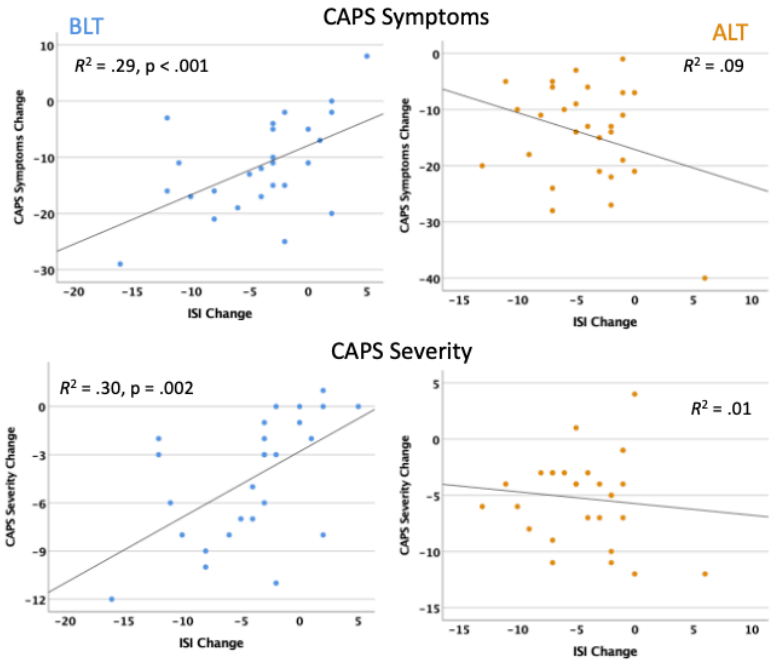


Figure 3.16. Scatterplots showing the association between improvements in insomnia symptoms on the ISI and improvements in PTSD as measured by the Clinician Administered PTSD Scale (CAPS). The top row shows the associations between pre- to post-treatment changes in insomnia and the changes in the number of PTSD symptoms, and the bottom row shows the association between insomnia change and change in the severity of PTSD symptoms. Overall, declines in insomnia were significantly correlated with declines in PTSD symptoms and severity, but only within the BLT group, not the ALT group.

Similar findings were evident for most of the scales of the CAPS. Table 4 shows the correlation between the change in ISI scores and the change in various subscales of the CAPS. The table also shows the statistical test comparing the two correlations using Fishers r-to-z transform. Overall, it is clear that there were no associations between change in insomnia symptoms and changes in PTSD outcomes for the ALT group, but many of the subscales of the CAPS showed significant associations for the BLT group. *These findings suggest that improvements in insomnia were associated with improvements in PTSD outcomes, but only for the BLT group.*

	Blue (BLT)		**Amber (ALT)**			
CAPS Score Change	**r**	**p**	**r**	**p**	**Fisher-z**	**p**
Total Symptoms	**.515**	**.0007**	-.126	.470	2.76	.003
Total Severity	**.471**	**.002**	-.026	.883	2.13	.016
Intrusions Symptoms	.095	.560	-.048	.783	0.57	.285
Intrusions Severity	**.363**	**.021**	-.061	.728	1.75	.040
Avoidance Symptoms	**.388**	**.013**	-.297	.083	2.84	.002
Avoidance Severity	**.353**	**.026**	-.311	.069	2.74	.003
Cognitions Symptoms	.256	.110	.088	.614	0.69	.245
Cognitions Severity	.305	.056	-.057	.744	1.48	.070
Arousal Symptoms	**.455**	**.003**	-.087	.621	2.29	.011
Arousal Severity	**.409**	**.009**	-.102	.559	2.13	.017

Distress Symptoms	.285	.075	.140	.422	0.60	.273
Distress Severity	**.392**	**.012**	.036	.836	1.50	.067
Dissociative Symptoms	.245	.127	.148	.395	0.40	.344
Dissociative Severity	.277	.084	-.080	.650	1.45	.074

Table 4. Correlations between changes in Insomnia Severity Index (ISI) scores and changes in PTSD outcomes on the Clinician Administered PTSD Scale (CAPS).

2b.2 Clinical Measures of Emotional Distress

2b.2a Main Study Effects on Measures of Depression

Results similarly reveal that participants were improving in their depression symptoms between baseline and post-training assessments. There were significant decreases in depression, as measured by the Beck Depression Inventory (BDI-II), $F(1, 75) = 63.92$, $p < .001$, $\eta_p^2 = .46$, and the Patient Health Questionnaire (PHQ), $F(1, 77) = 39.49$, $p < .001$, $\eta_p^2 = .34$. Once again, these effects of time were not qualified by an interaction with treatment condition, *p*s = .780 & .650 respectively (see Figure 3.17).

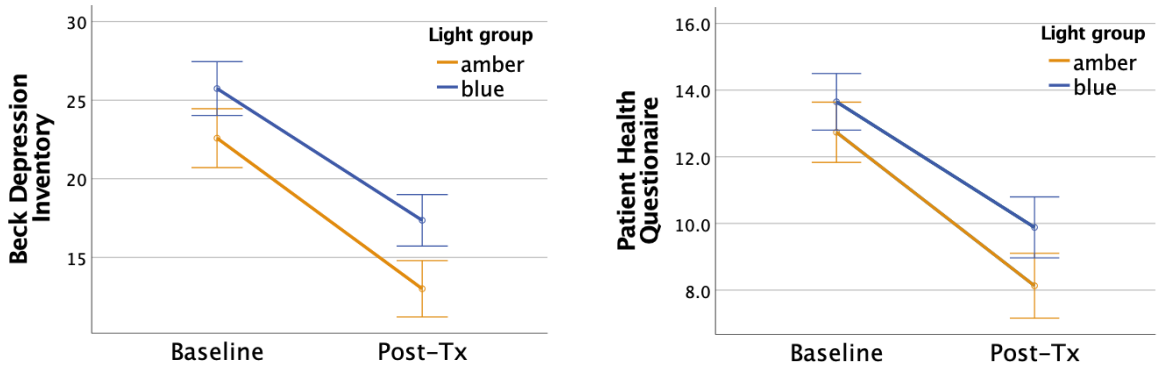


Figure 3.17. Improvements in depression symptoms as a function of light condition and time

Sleep Correlations with Depression Symptoms

We examined the change in actigraphic sleep parameters from pre- to post-treatment and their correlation with changes in depression symptoms and severity during that same time frame. Difference scores on wake after sleep onset (WASO) were calculated from pre- to post-treatment for each group and correlated with the difference scores from the Beck Depression Inventory (BDI). As shown in Figure 3.18, for the BLT group there was a significant correlation between changes in WASO and changes in depression (r = .557, p .004), but this was not evident for the ALT group (r = -.009, p = .97). Similarly, the BLT group showed a significant positive association between the change in sleep efficiency (SE) and the change in depression (r = -.601, p = .002), but this was not found for the ALT group (r = .131, p = .54).

Interaction Effects Related to Depression Symptoms, Study Phase, and Light Condition

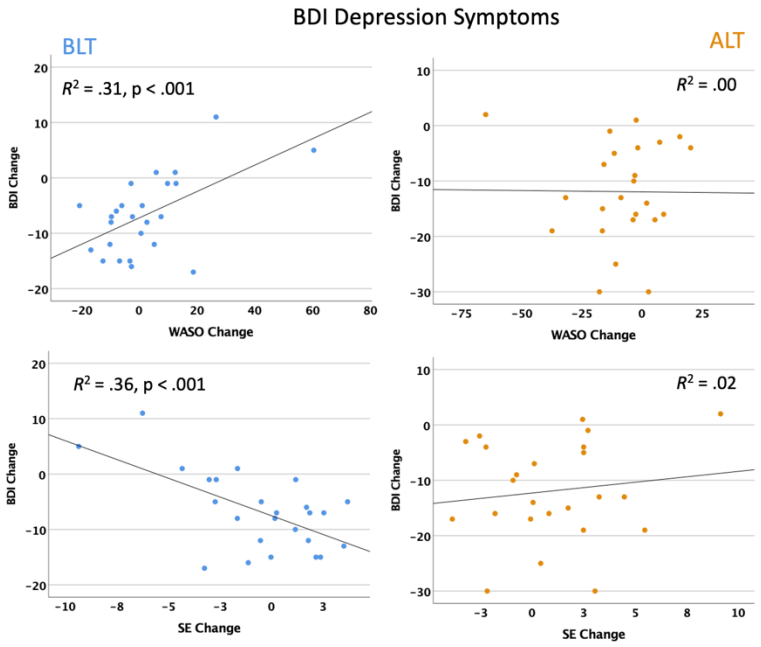


Figure 3.18. Scatterplots showing the association between changes in actigraphic sleep outcomes, including wake after sleep onset (WASO) and sleep efficiency (SE) and changes in depression on the Beck Depression Inventory (BDI) for each light condition. Blue light treatment (BLT) led to significant correlations between WASO change and BDI, and between SE change and BDI, whereas no associations were found for the ALT group.

Changes in levels of depression, as measured by the BDI, varied across study phase and light condition by the degree of PTSD symptom severity, measured by the CAPS. When incorporating the CAPS symptom severity score into the mixed effects model, we found a significant negative interaction effect on study phase by group, (beta = -0.46, 95% CI [-0.87, -0.05], t(150) = -2.20, p = 0.028; Std. beta = -0.45, 95% CI [-0.86, -0.05]). This resulted in a substantial gross increase in the model's marginal $R^2 = 0.357$, as accounted for by the fixed effects. As shown in Figure 3.19, subjects in the BLUE light condition with greater levels of trauma symptom severity had greater decreases in symptoms related to depression, while subjects in the AMBER light group were observed to have the opposite trend. This suggests the possibility that BLUE light therapy may serve as a more potent intervention with increasingly severe symptom presentations.

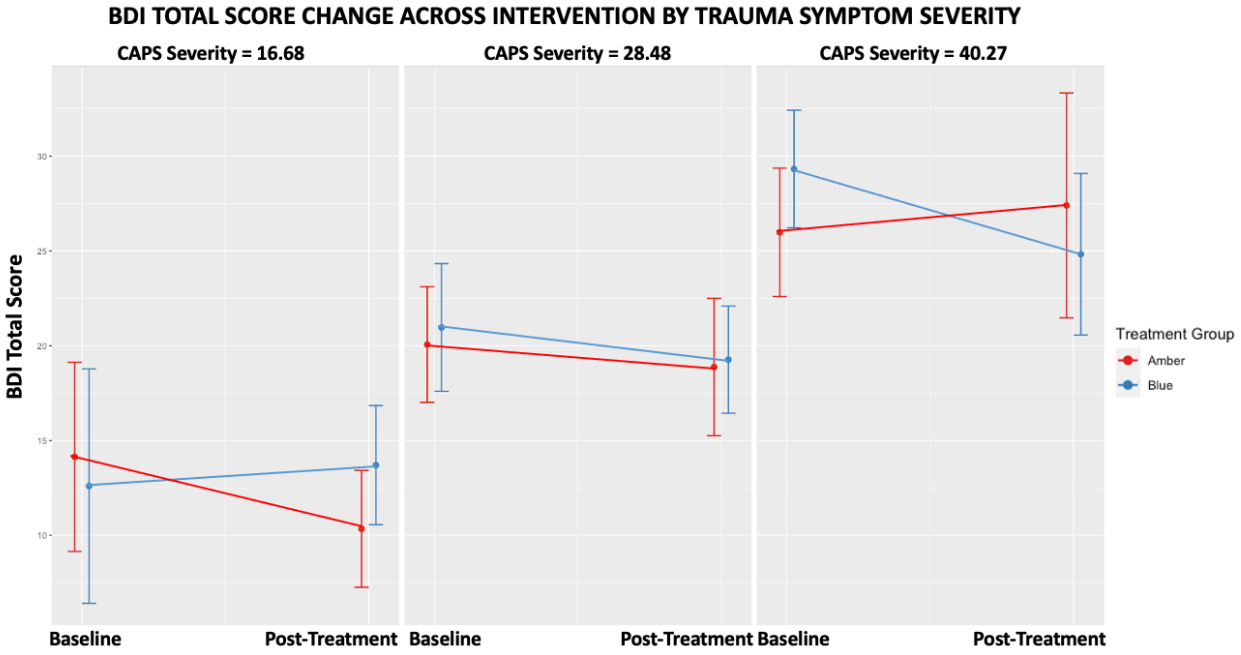


Figure 3.19. Improvements across time in depression symptoms as a function of light condition and trauma symptom severity; plots are separated at the mean by one standard deviation for visualization purposes.

We also found a significant interaction between the average amount of daily sleep subjects had with study phase and light condition on depression, as measured by the PHQ. When incorporating the average amount of daily sleep participants had (measured by actigraphy) into the mixed effects model, we found a significant negative interaction effect of CAPS symptom severity on study phase by group, (beta = -0.06, 95% CI [-0.10, -0.02], t(145) = -3.09, p = 0.002; Std. beta = -0.67, 95% CI [-1.09, -0.24]). This resulted in a minimal gross increase in the model's marginal $R^2 = 0.026$, as accounted for by the fixed effects.
As show in Figure 3.20, subjects in the BLUE light condition with greater levels of trauma symptom severity, measured by the CAPS, had greater decreases in depression related symptoms on the BDI, while subjects in the AMBER light group were observed to have the opposite trend. This may indicate that individuals receiving blue light therapy may need to have more acute deficits in total sleep time addressed before engaging in active treatment.

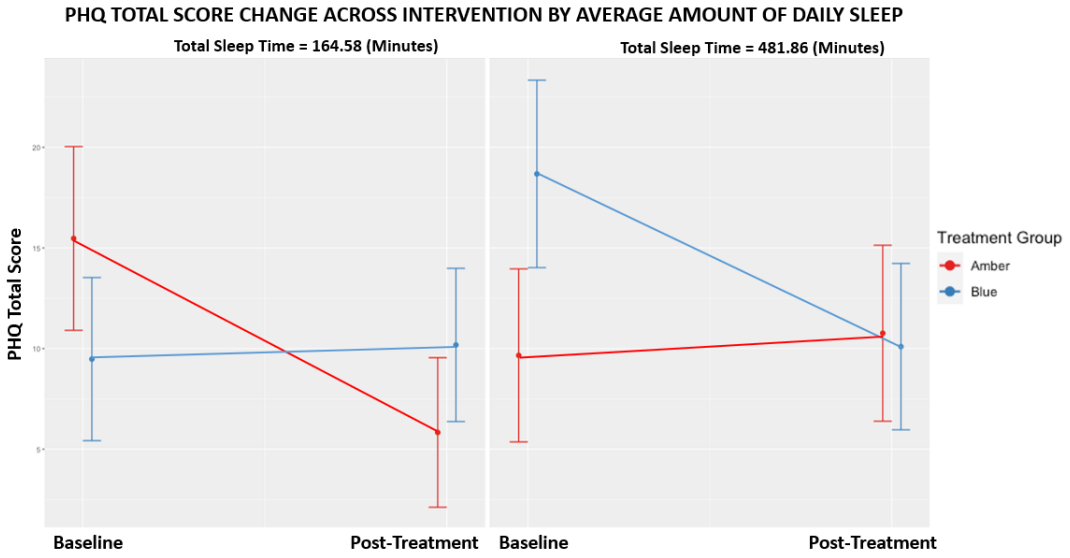


Figure 3.20. Improvements across time in depression symptoms as a function of light condition and average amount of sleep per day; plots are separated at the minimum and maximum values for visualization purposes.

2b.2b Measures of Anxiety

Main Study Effects on Measures of Anxiety

Participants tended to report a decline in anxiety symptoms between baseline and post-treatment assessment sessions. Participants reported lower scores on the Beck Anxiety Inventory (BAI), $F(1, 75) = 34.37$, $p < .001$, $\eta_p^2 = .31$. They also reported lower levels of state anxiety, $F(1, 77) = 4.11$, $p = .046$, $\eta_p^2 = .05$, and trait anxiety, $F(1, 77) = 36.65$, $p < .001$, $\eta_p^2 = .33$. Participants showed similar decreases for both

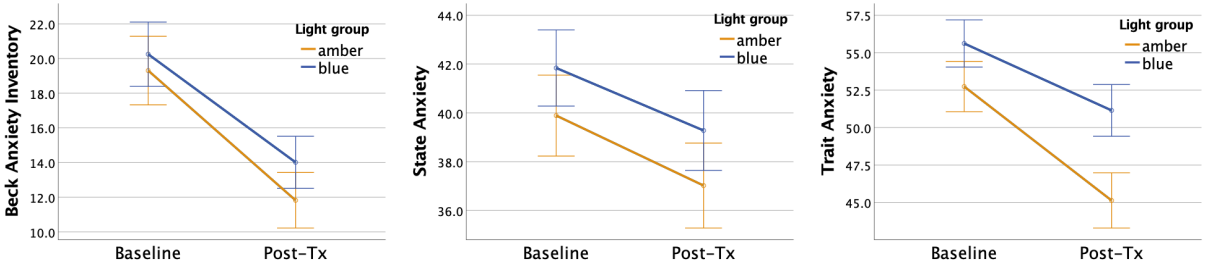


Figure 3.21. Improvement to anxiety symptoms as a function of light condition and time.

BAI and state anxiety scores, *p*s. = .487 & .846 respectively. However, there was a significant group x time interaction predicting trait anxiety scores. As shown in Figure 3.21, individuals in the amber light condition reported greater declines in trait anxiety relative to those in the blue light condition. This is contrary to what was hypothesized.

Interaction Effects Related to Anxiety Symptoms, Study Phase, and Light Condition

We found a significant interaction between the type of exposure (direct vs. indirect) the primary trauma event occurred in for subjects, with study phase and light condition on anxiety, as measured by the BAI. When incorporating trauma exposure type into the mixed effects model, we found a significant positive interaction effect of trauma exposure type on study phase by group, (beta = 12.46, 95% CI [1.14, 23.78], t(151) = 2.16, p = 0.031; Std. beta = 1.08, 95% CI [0.10, 2.06]). This resulted in a gross increase in the model's marginal R^2 = 0.049, as accounted for by the fixed effects. As shown in Figure 3.22, subjects in the BLUE light condition that did not experience a direct trauma demonstrated a trending increase in anxiety symptoms across the study period, while subjects in the AMBER light group were observed to have similar decreases in symptoms, regardless of exposure type. This may suggest that individuals who experience an indirect trauma event are less likely to have positive improvements in anxiety-based symptoms related to BLUE light therapy.

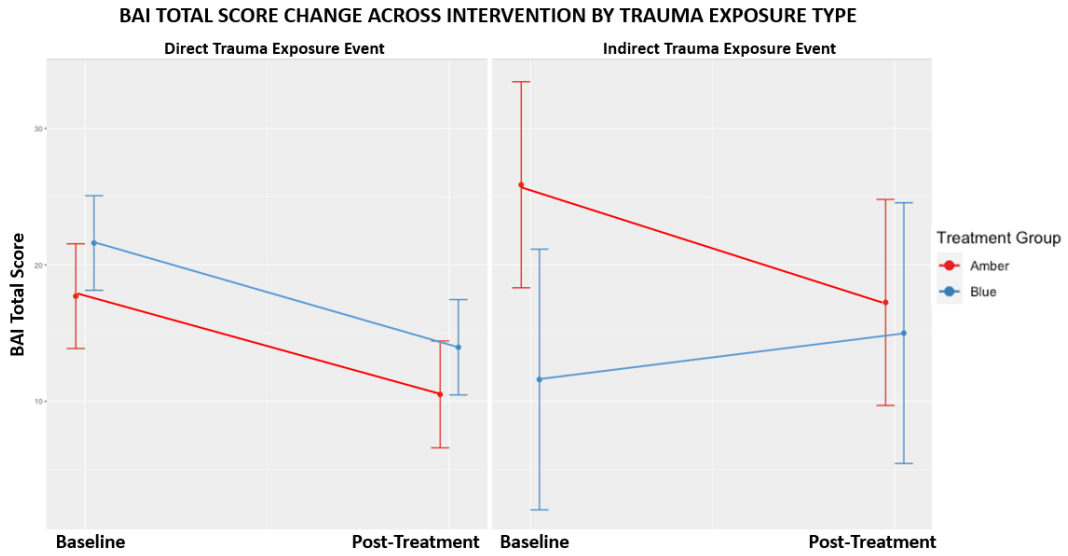


Figure 3.22. Improvements across time in anxiety symptoms as a function of light condition and trauma exposure type, demonstrating the interaction is driven by the differential effect on anxiety symptoms for subjects that experienced an indirect

We also found a significant interaction between the number of trauma symptoms endorsed and state anxiety level changes across subjects, with study phase and light condition. When incorporating CAPS symptom endorsement into the mixed effects model, we found a significant negative interaction effect of trauma symptoms on study phase by group, (beta = -2.64, 95% CI [-4.73, -0.54], t(148) = -2.47, p = 0.014; Std. beta = -0.59, 95% CI [-1.06, -0.12]). This resulted in a gross increase in the model's marginal R^2 = 0.089, as accounted for by the fixed effects. As shown in Figure 3.23, subjects in the BLUE light condition with the greatest number of trauma symptoms demonstrated a trending decrease in anxiety symptoms across the study period, while subjects in ALT demonstrated the opposite effect. This is similar to observed associations between trauma symptom presentations and depression and supports the notion that BLT is more effective for individuals with more severe PTSD symptom presentations.

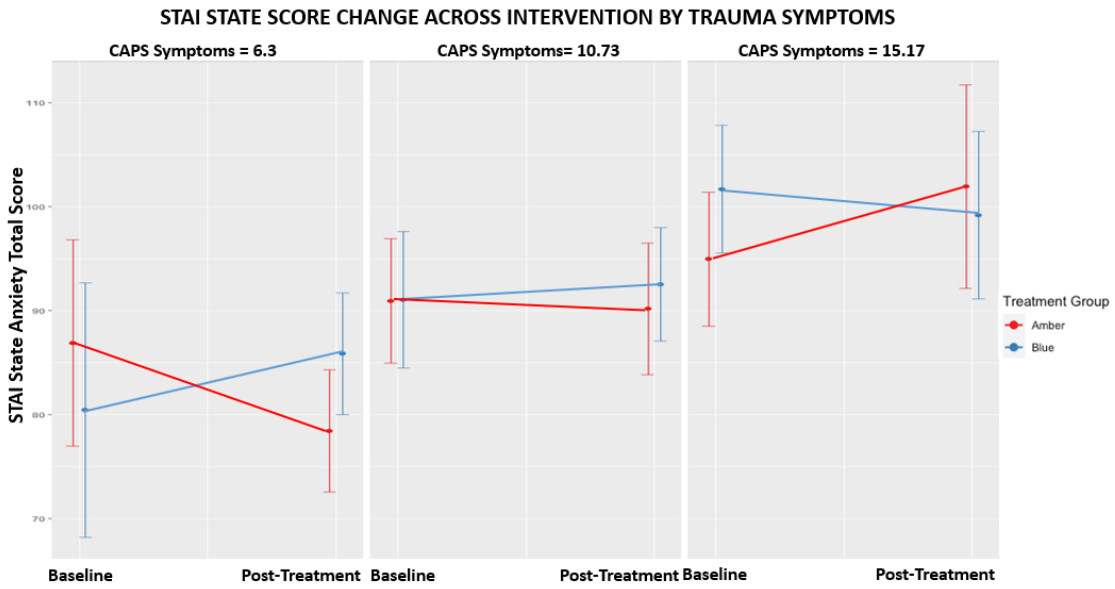


Figure 3.23. Improvements across time in state-anxiety symptoms as a function of light condition and trauma symptom endorsement; plots are separated at the mean by one standard deviation for visualization purposes.

Fear Conditioning and Extinction

Fear Conditioning, Extinction Learning, and Extinction Recall were analyzed using mixed Analysis of Variance (ANOVA). Included in all ANOVAs was the between-subjects factor for "Group" (Amber, Blue) and the within-subject factor CS Type (CS+ and CS-) and Trial (number varied with phase and analysis, see Results). For Fear Conditioning, a second within-subject variable, "Order" (CS+1 and CS+2), was added to the model. For Extinction Learning, Trial was replaced with "Trial Pair", which averaged Extinction Learning trials in a pair-wise manner (Trial 1 & 2, 3 & 4… 15 & 16). During Extinction Recall, an additional within-subject variable, "CS+ Type" (CS+E and CS+U) was added to the model. All pair-wise comparisons within the ANOVA model were made using means comparisons. Potential confounding effects of discrete (sex) or continuous variables PTSD severity (PCL-5 total, CAPS-5 severity), age, maximum SCR to a CS+ during Conditioning and WASO were tested by adding them to total models. Significance was set at $p<0.05$ and the Greenhouse-Geisser correction was applied to all within-subject main effects and their interactions. Simple regression analyzed relationships between psychophysiological and subjective summary outcome measures, subjective and objective sleep variables, and psychometric measures utilized Pearson correlations. Two-sample t-tests compared BLT and ALT groups for each of the unitary indices (CondIdx, ExtIdx, ERI).

Results

Because there was a main effect on SCR of being a conditioner vs. non-conditioner [$F(1,74)=6.11$, $p=0.0158$, $p\eta 2 = .0762$], the 8 BLT- and 6 ALT-Group non-conditioners were excluded from further analyses. This left a total sample size of 68 with 34 each in the Amber and Blue groups and 23 males and 45 females.

Lack of baseline differences in SCR between Groups during Fear Conditioning was established by no main effect of Group or interaction of Group with Order, CS Type or Trial or higher order interactions of Group with these factors (all p's >0.22). Similarly, at Extinction Learning, there was no main effect of

Group or interactions of Group with CS Type, Trial or higher-order interactions (all p's> 0.26).

SCR measurements confirmed that conditioning was acquired and extinguished. For Fear Conditioning there was a significant Order x CS Type X Trial interaction [F(6,342)=2.76, p=0.0172, pη2 = 0.0462]. Similarly, at Early Extinction there was a significant CS Type x Trial interaction [F(7,462)=2.98, p=0.0082, pη2 = 0.0432].

Among unitary indices, Amber- and Blue-light groups did not differ in maximum SCR to a CS+ (at Conditioning) or in CondIDx and ExtIdx at baseline, nor did they differ in ERI at the end of treatment (all p's >0.42). In addition, none of these indices correlated with PCL-5 total or CAPS-5 severity scores (all p's>0.23) with the exception of a positive correlation between CAPS-5 severity and maximum SCR to a CS+ at Conditioning (R=0.252, p=.045).

At Extinction Recall, a main effect of CS_Type (CS+ vs. CS-) indicated retention of differential conditioning. However, lack of a main effect of CS+Type (CS+E vs. CS+U) indicated that the distinction between the extinguished and unextinguished CS+ was not retained across all subjects. At Extinction Recall, there was no main effect of Group, nor were there interactions of Group with CS_Type, CS+Type, or Trial (all p's > 0.13) or 3- or 4-way interactions with these within-subject factors with the exception of a Group x CS+Type x Trial interaction [F(3,186)=3.48, p=0.026, pη2 = 0.0531]. Therefore the 2 Groups were examined individually. In the Blue Group, there were no significant main effects or interactions. However, CS+-Type, CS_Type and Trial main effects appeared as trends (p=0.089, 0.089 and 0.068 respectively) with absolute value of SCR for CS+ > CS- and CS+U > CS+E. In the Amber Group, there was no main effect of CS+Type, but significant main effects for CS_Type [F(1,31)=11.86, p=0.0017, pη2 = 0.277], Trial [F(3,93)=6.30, p=0.0025, pη2 = 0.169]. There was, in addition, a CS+ x Trial interaction [F(3,93)=4.05, p=0.0184, pη2 = 0.116]. This interaction resulted from a significantly greater SCR in the first trial to the CS+E than to the CS+U [p=0.0025), but not in Trials 2-4 (all p's>0.38). In contrast, in the Blue group, despite lack of an interaction (p=0.666), there was a greater SCR in the first trial to the CS+U than to the CS+E (p=0.0464), while in all other trials, the CS+Type did not significantly differ (all p's > 0.15) in each trial the absolute value of CS+U was greater than CS+E CS+E resulting in the above-noted a trend for the main effect of CS+Type (CS+U > CS+E).
When added ANOVA models, the continuous variables, that included PTSD severity (PCL-5 total, CAPS-5 severity), age, maximum SCR to a CS+ during Conditioning and WASO, showed no main effect and only a few interactions with Group. Age showed a 3-way interaction with Group and CS_Type [F(1,60)=5.73, p=0.0198, pη2 = 0.087] and the Group x CS_Type approached significance [F(1,60)=3.84, p=0.055,

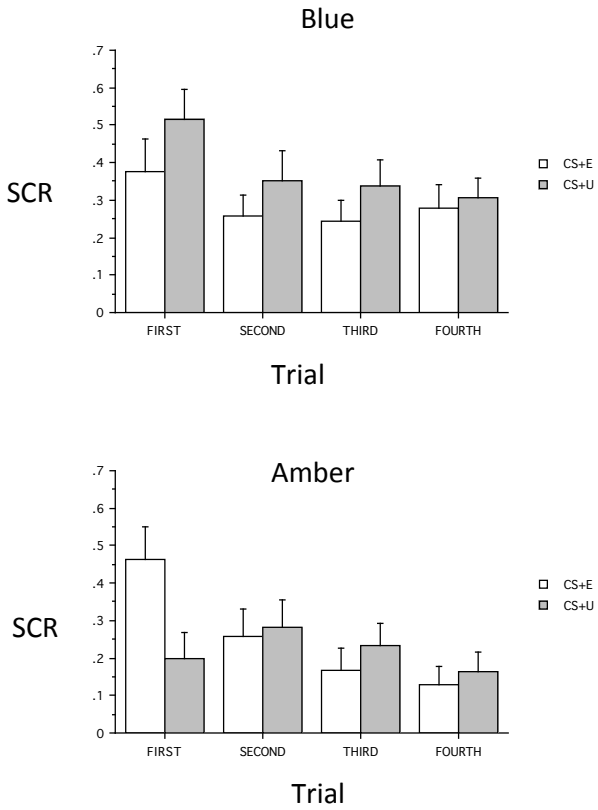


Figure 3.24. Skin conductance responses (SCR) across trials for the blue light treatment-BLT (top) and amber light placebo treatment-ALT (bottom) for the extinguished (CS+E) versus unextinguished (CS+U). The BLT condition led to reduced SCR to extinguished relative to unextinguished stimuli (especially on the first trial), while the opposite was true for the amber placebo condition.

pη2 = 0.06]. Similarly, when maximum SCR to a CS+ during Conditioning was added, it showed a 3-way interaction with Group and CS_Type [F(1,57)=8.80, p=0.004, pη2 = 0.087] and the Group x CS_Type interaction was significant [F(1,57)=4.34, p=0.0418, pη2 = 0.134]. In both cases, the difference between the (combined) CS+s and the CS- was greater in Amber.

However, when Sex was added to the model, there was a significant Group x Sex interaction [F(1,60)=5.10, p=0.027, pη2 = 0.079] as well as Group x CS+Type [F(1,60)=4.32, p=0.0420, pη2 = 0.067] and Group x CS_Type x Sex interaction [F(1,60)=4.03, p=0.0493, pη2 = 0.063]. The Group x CS+Type x Trial interaction approached significance [F(2,180)=2.85, p=0.053, pη2 = 0.045].

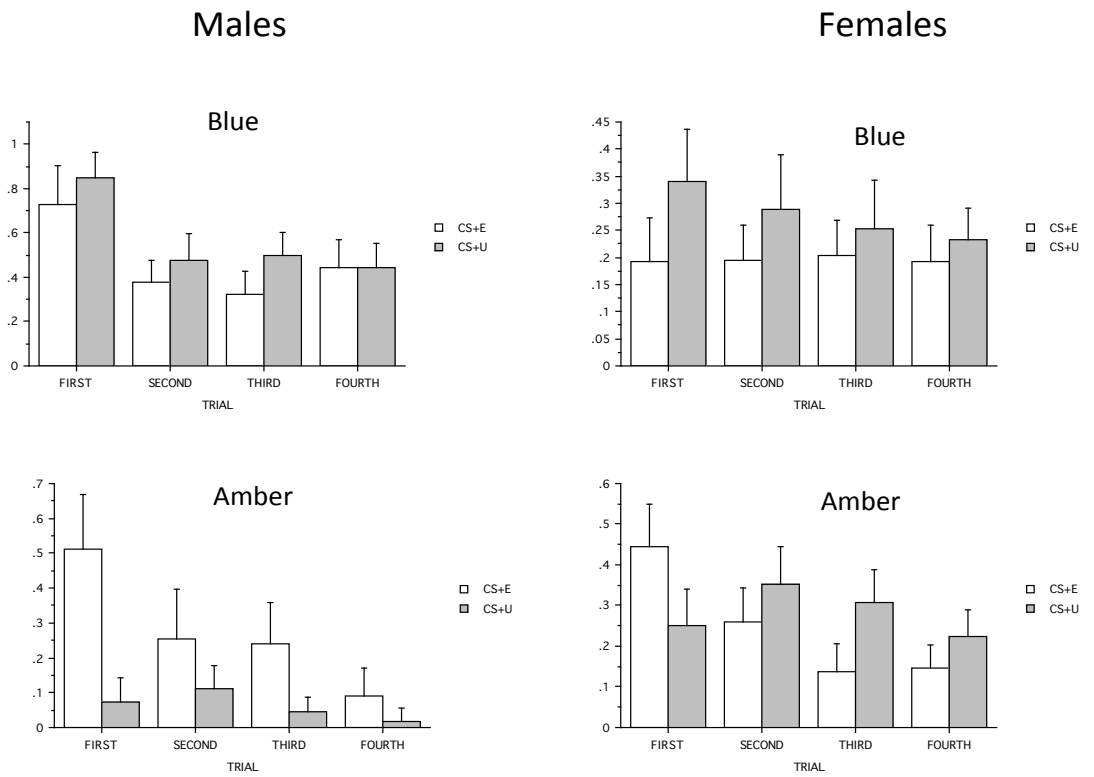


Figure 3.25. Sex x light color interactions on skin conductance responses (SCR) across trials for the blue light treatment-BLT (top) and amber light placebo treatment-ALT (bottom) for the extinguished (CS+E) versus unextinguished (CS+U).

When the 23 males were examined separately, there was a significant Group main effect [F(1,18)=8.12, p=0.0107, pη2 = 0.311, blue larger] and the Group x CS+Type Interaction approached significance [F(1,18)=4.31, p=0.0525, pη2 = 0.193]. The Group x CS+Type x Trial interaction observed in the total sample was absent (p=0.30]. Among males there was no CS+Type x Trial interaction in either the 10 ALT or the 13 BLT males (p=0.26 and 0.51 respectively).

Among the 45 females were examined separately among 24 Amber and 21 Blue, there was a Group x CS_Type interaction [F(1,42)=4.15, p=0.048, pη2 =0.09] and the Group x CS+Type x Trial was a trend [F(3,126)=2.68, p=0.07, pη2 =0.06]. Among ALT females there was CS+Type x Trial interaction approached significance [F(3,66)=2.83, p=0.06, pη2 =0.114; CS+E larger] whereas this interaction was not significant in BLT females (0.66).

The chief difference between the BLT and ALT groups at Extinction Recall was that, for BLT, absolute values of the SCR to conditioned and un-extinguished stimuli (CS+U) were consistently higher than the conditioned and extinguished stimuli (CS+E) as would be expected from retained extinction memory (Figure 3.24). In contrast, for ALT, the opposite was the case (Figure 3.24). Whereas this interaction (Group x CS+Type) did not reach trend or significance levels across all 4 trials, in the first trial, SCR to the CS+E significantly exceeded that to the CS+U in the BLT group, whereas SCR to the CS+U significantly exceeded that to the CS+E in the BLT group. If one assumes new (re)extinction immediately begins to take place during Extinction Recall, then this first trial takes on special significance as purely reflecting extinction recalled rather than a combination of prior extinction memory and new extinction being learned. As there was a significant Group x Sex interaction and the Group x CS+Type x Trial interaction approached significance, the two groups within each of the two sexes were examined individually. Although the CS+Type x Trial interaction did not reach significance in either sex alone, a similar Group difference (i.e., SCR to CS+U>CS+E in BLT, CS+E>CS+U in ALT) appeared in each sex individually especially in the first trial (Figure 3.25). Although one might expect the CS+Type x Trial to be present in ALT Males (Figure 3.25), the low sample size of this subgroup (N=10) likely prevented this. Thus, the ALT group was reacting to a previously extinguished stimulus not only as if was unextinguished, but even more than to the unextinguished stimulus whereas the BLT was reacting as would be expected given prior extinction learning. This suggests that, although differential conditioning was retained across all subjects (CS+>CS-) all subjects, retention of stimulus-specific extinction memory occurred only in the BLT group.

SPECIFIC AIM 3: At the time of project initiation, there were no known studies that had examined the neurobiological correlates of symptom improvement in patients with PTSD following light exposure therapy. The present study aimed to provide clear evidence of functional and neurochemical changes that are associated with changes in sleep, cognition, and PTSD symptoms from pre- to post-treatment. Even if the first aim (Aim 1) was not supported, the obtained cross-sectional data was expected to provide critical insights regarding the association between sleep, neurometabolites, and brain function within patients with PTSD. This correlational information is currently lacking for PTSD and will fill an important knowledge gap regardless of whether the light therapy is successful.

Hypothesis 3a: Relative to ALT, six weeks of BLT will lead to significantly increased ventromedial prefrontal activation and reduced amygdala activation during the backward masked affect fMRI task.

Prior research suggests that individuals with PTSD tend to show hyper-responsiveness of the amygdala and decreased medial prefrontal activation during functional magnetic resonance imaging (fMRI) when processing **fearful face stimuli** presented below the threshold of normal conscious perception (Killgore et al., 2014; Rauch et al., 2000). This is done with a task known as the Backward Masked Affect Task (BMAT). This task, first developed by our group back in the mid-1990's (Whalen et al., 1998), presents a series of facial expressions displaying happiness or fear, each for only 16 msec and masked immediately by a neutral image from a different poser for 184 msec (Figure 3.26). At this rate of presentation, the "masked" affective expression is not consciously perceived yet is still processed via an extrastriate pathway to the amygdala that bypasses normal cortical

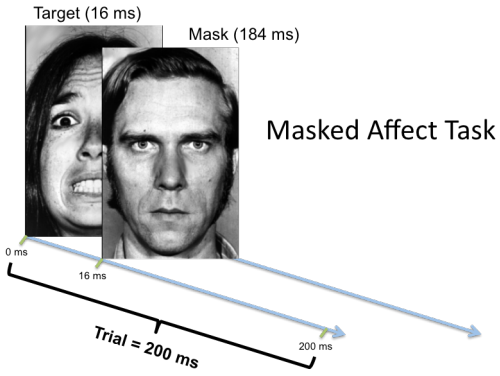


Figure 3.26 Backward Masked Affect Task: A target emotional facial expression is presented for 16 ms and masked immediately by a neutral face for a longer duration (184 ms). This effectively prevents awareness of the target emotional expression, although it is perceived at a non-conscious level.

processing. The fear BMAT has been shown to selectively activate the amygdala in healthy participants. Moreover, in our laboratory, exaggerated amygdala response has been found on this task in patients with PTSD (Rauch et al., 2000). This finding is most consistent with the Fear version of the task, but has been shown with Happy facial expressions as well (Killgore et al., 2014). Our laboratory has extensive experience using this task with patients with PTSD and anxiety disorders (Barrett et al., 2007; Ohrmann et al., 2007; Rauch et al., 2000; Reker et al., 2009; Suslow et al., 2009; Suslow et al., 2006), and healthy adults and children (W. D. S. Killgore & D. Yurgelun-Todd, 2007; Killgore & Yurgelun-Todd, 2004; W. D. S. Killgore & D. A. Yurgelun-Todd, 2007).

Each run of the BMAT lasted for 180 seconds and involved three different conditions presented in a block design. The task began with a 15 second period with a fixation crosshair image shown on the screen. This allowed the scanner to reach a steady state and provided an initial baseline. Then for the next 30 seconds, the participant viewed a series of Masked Neutral images (i.e., an emotionally neutral face would appear on the screen for 16 ms and was immediately replaced by an emotionally neutral face from a different person for 184 seconds). The third block consisted of Masked Affect images (i.e., an emotional face (either expressing fear or happiness) was shown for 16 ms and immediately masked by a neutral face for 184 s). The fourth block switched back to the Masked Neutral condition, while the fifth block again presented the same Masked Affect images, and the final block consisted of 15 seconds of a fixation crosshair image. Two runs of the BMAT were completed, one presenting Masked Fear, and the other presenting Masked Happy images during the active condition.

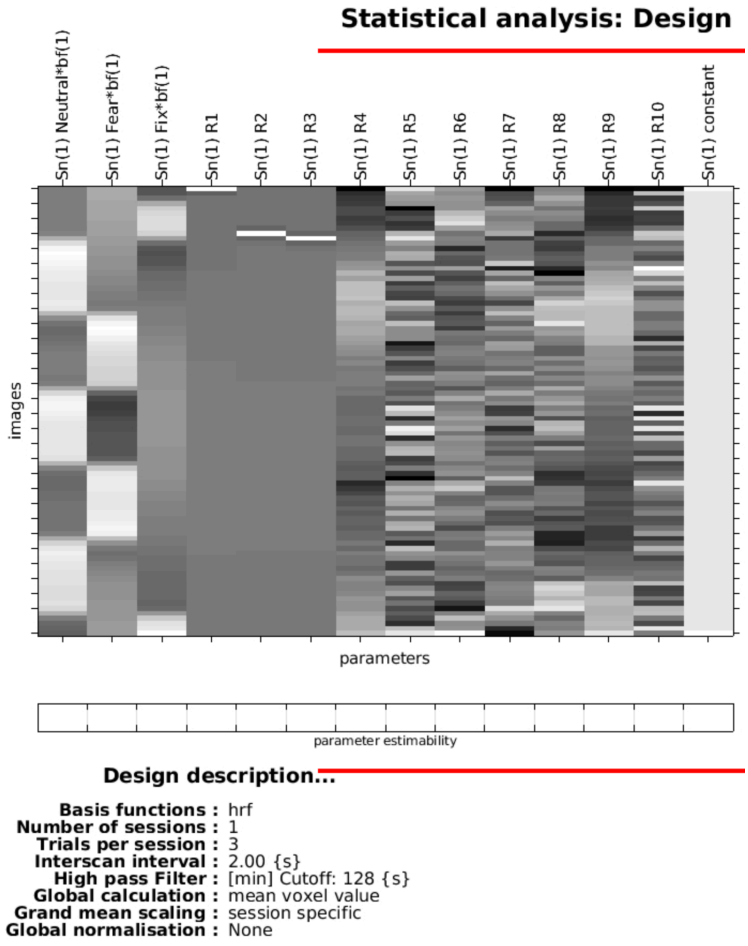


Figure 3.27 SPM Statistical Design Matrix for the Backward Masked Affect Task (BMAT). The first three columns represent the task conditions (masked neutral, masked affect, fixation). The middle columns reflect extreme outliers that were regressed out of the analysis due to excessive global signal intensity or excessive movement greater than 3 SD. The right columns reflect movement regressors.

An example statistical design matrix for the BMAT is shown in Figure 3.27. The first 3 columns represent the three conditions described above (masked neutral, masked affect, fixation). Additional columns were included to remove excessive signal intensity and movement (i.e., greater than 3 SD). The final columns include global signal intensity and six motion regressors. The primary contrast of interest for the reported outcomes below is the Masked Affect (i.e., either the masked fear or masked happy condition) > Masked Neutral (i.e., column 2 > column 1). For each affect condition, this contrast map was imported into the second level random effects analysis described below. Data were then analyzed in SPM12 using the Flexible Factorial model to build a 2 light condition (blue

vs. amber) x 2 session (pre-treatment vs. post-treatment) mixed ANOVA. This omnibus analysis was then decomposed with analyses of simple effects and t-tests.

Masked Fear

Omnibus ANOVA. For this task, participants were presented with a very brief image of a face showing the emotion of fear, which was then masked by a neutral expression. Data were analyzed using a 2 (ALT vs. BLT) x 2 (Baseline vs. Post-Tx) repeated measures mixed ANOVA via the flexible factorial module of SPM12. As a first pass analysis, the interaction effect was interrogated at $p < .05$ (uncorrected) height threshold, with a FDR cluster correction (FDR corrected $p < .05$). As shown in Figure 3.28, this yielded several significant clusters that showed a 2-way interaction between light conditions and time. As evident in the figure, the primary region of interaction was the anterior cingulate cortex (ACC)/medial prefrontal cortex (MNI: x = 8, y = 30, z = 2). However, there were also an interaction within the posterior insular cortex on the right (MNI: x = 40, y = -18, z = 8), right cuneus (MNI: x = 16, y = -66, z = 30), and the left superior temporal gyrus (MNI: x = 8, y = 30, z = 2). Each of these regions was extracted and plotted, as shown in Figure 3.29).

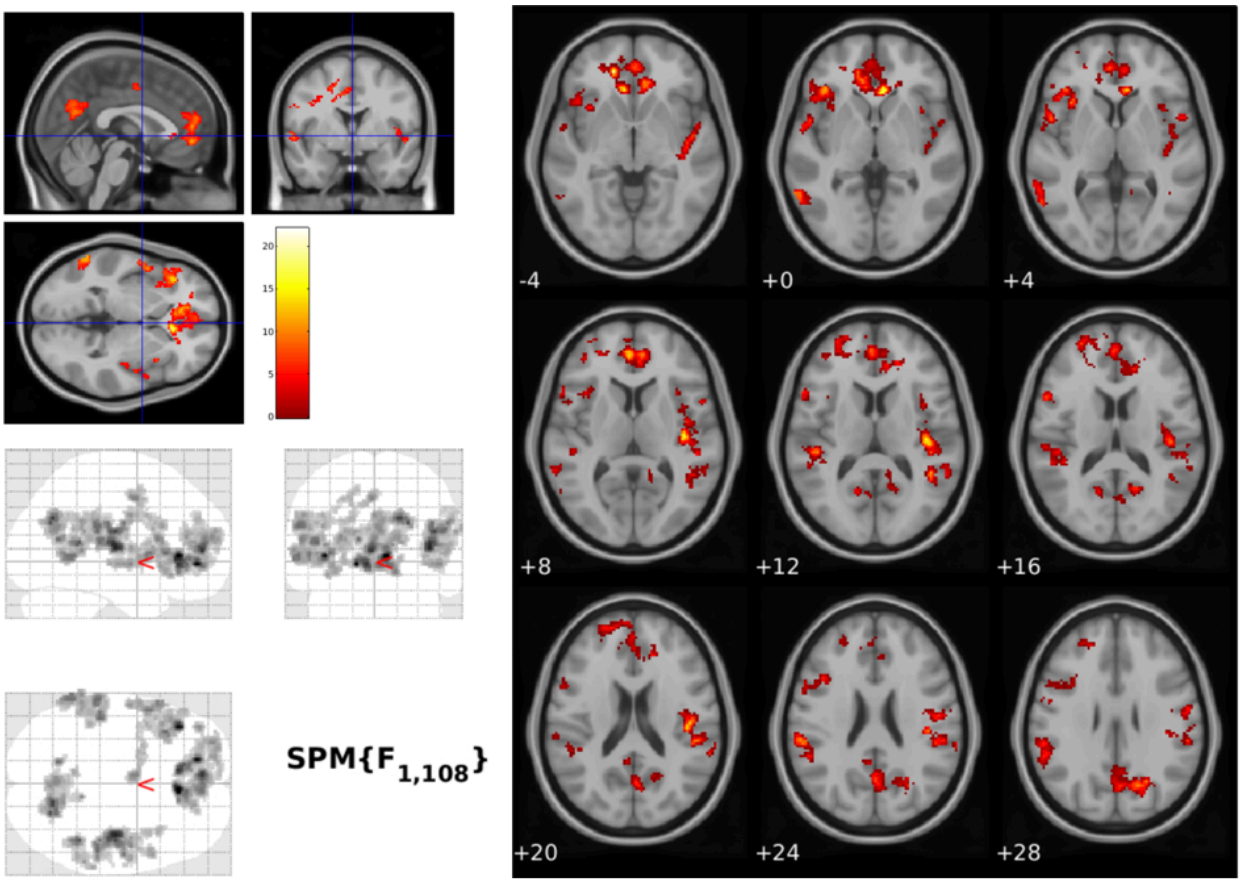


Figure 3.28. Omnibus 2(Blue vs. Amber) x 2(Baseline vs. Post-Tx) interaction analysis for the BMAT Masked Fear condition. Data are height thresholded at $p < .05$ (uncorrected), with a cluster correction ($p < .05$, FDR whole brain cluster corrected). The top left figure shows the sagittal, coronal, and axial slice image at 0, 0, 0. The bottom left image presents the same data as a multiple image projection (MIP) on the canonical "glass brain." The right figure shows a montage of representative axial slices showing the location of the voxels where the interaction was observed.

Statistics: ***p-values adjusted for search volume***

set-level		cluster-level				peak-level					mm	mm	mm
p	c	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	F	(Z_E)	p_{uncorr}			
0.000	**6**	**0.000**	**0.000**	**1857**	**0.000**	**0.488**	**0.648**	**22.08**	**4.32**	**0.000**	**6**	**30**	**2**
						0.710	0.648	20.40	4.16	0.000	-16	44	-4
						0.990	0.999	16.87	3.78	0.000	-4	48	6
		0.171	**0.031**	**410**	**0.001**	**0.742**	**0.648**	**20.15**	**4.13**	**0.000**	**-40**	**30**	**2**
						1.000	0.999	12.64	3.26	0.001	-36	20	4
						1.000	0.999	9.54	2.80	0.003	-46	24	4
		0.000	**0.000**	**1374**	**0.000**	**0.927**	**0.999**	**18.37**	**3.95**	**0.000**	**40**	**-18**	**8**
						0.999	0.999	15.51	3.62	0.000	44	-18	20
						1.000	0.999	14.12	3.45	0.000	44	-46	12
		0.002	**0.001**	**831**	**0.000**	**0.999**	**0.999**	**15.75**	**3.65**	**0.000**	**16**	**-66**	**30**
						1.000	0.999	14.42	3.49	0.000	24	-68	26
						1.000	0.999	12.21	3.20	0.001	-14	-62	14
		0.009	**0.002**	**677**	**0.000**	**1.000**	**0.999**	**12.87**	**3.29**	**0.001**	**-46**	**-30**	**12**
						1.000	0.999	12.68	3.26	0.001	-60	-32	24
						1.000	0.999	12.49	3.24	0.001	-60	-52	2
		0.014	**0.003**	**639**	**0.000**	**1.000**	**0.999**	**11.81**	**3.14**	**0.001**	**-52**	**8**	**4**
						1.000	0.999	11.12	3.04	0.001	-4	-4	44
						1.000	0.999	10.93	3.01	0.001	-58	14	14

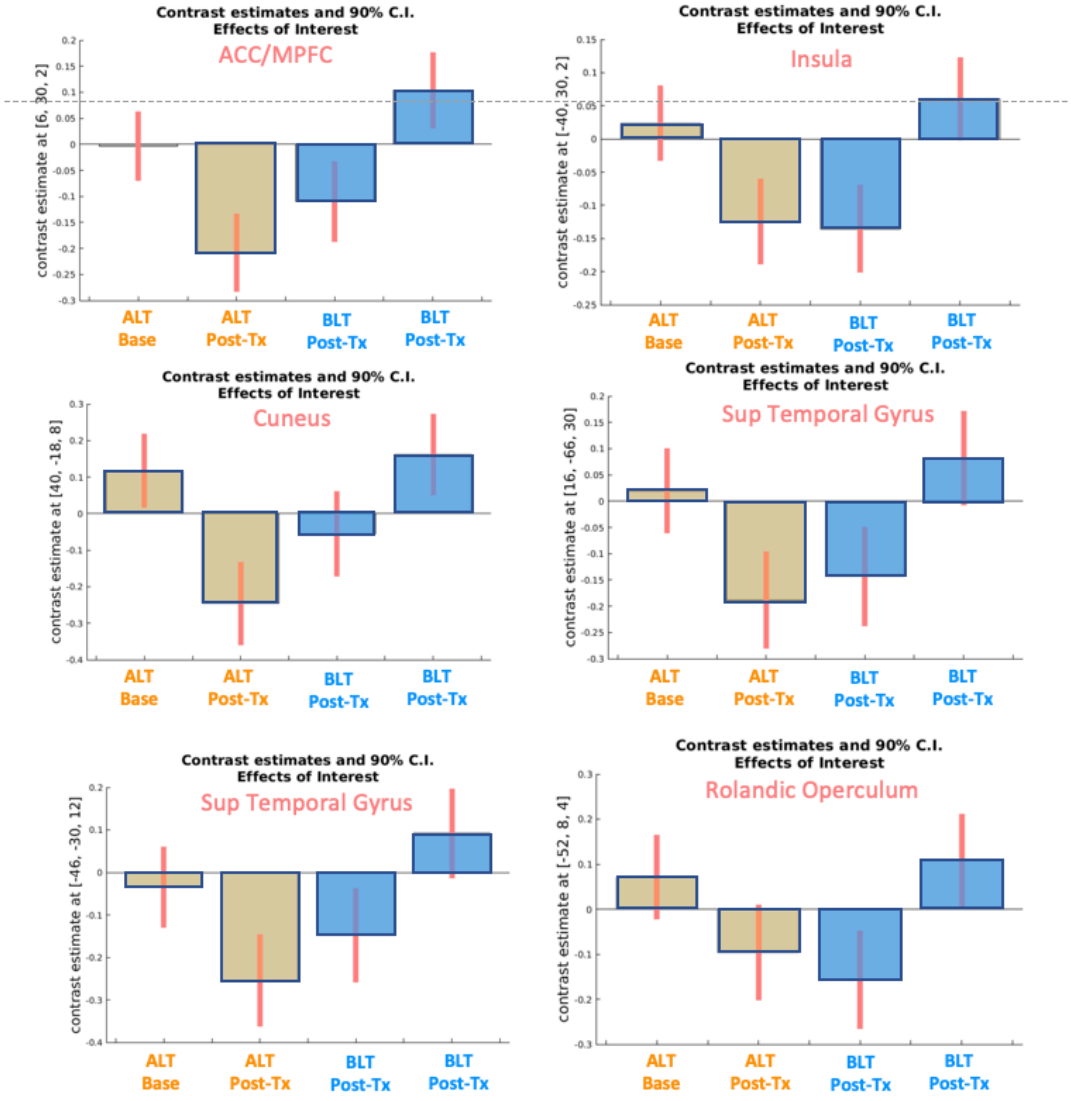


Figure 3.29 Outcome data from the light condition x session interaction for the BMAT Fear task. Data are height thresholded at $p <$ .05 (uncorrected), with a cluster correction ($p <$ .05, FDR whole brain cluster corrected). The top table provides the MNI statistics and MNI coordinates for the four primary clusters that emerged as showing a significant interaction. The bottom figures reflect the contrast estimates at the maximally activated voxel within each cluster. As evident in all six figures, the amber condition showed significant declines in activation in these regions from baseline to post-treatment, while the blue condition was associated with significant increases from baseline to post-treatment.

Post Treatment Differences. While the overall pattern of findings suggests that BLT was successful at activating regions of the medial prefrontal cortex and non-hypothesized cortical regions, we further examined the activation patterns by comparing the post-treatment activation maps from the BLT versus the ALT conditions using a 2-sample t-test. Figure 3.30 shows the regions that were significantly more active at post-treatment for the BLT compared to the ALT group at a whole-brain level, with an uncorrected height threshold of $p < .005$, with a cluster-wise correction (FDR $p < .05$). As evident in this contrast, the medial prefrontal cortex/ACC once again was significantly more activated in the BLT group than the ALT group when viewing the unconscious presentation of fearful facial expressions (MNI: x = 6, y = 30, z = 2). Additionally, it is apparent from the figure that BLT was associated with greater activation within the anterior insula on the left (MNI: x = -52, y = 12, z = 20) and the posterior insula on the right (MNI: x = 40, y = -18, z = 8), as well as a small cluster in the left dorsolateral prefrontal cortex (MNI: x = -22, y = 58, z = 20).

Statistics: ***p-values adjusted for search volume***

set-level		cluster-level				peak-level					mm	mm	mm
p	c	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}			
0.000	**8**	**0.050**	**0.019**	**158**	**0.001**	**0.156**	**0.308**	**4.89**	**4.64**	**0.000**	**6**	**30**	**2**
						1.000	0.557	3.66	3.54	0.000	-2	32	0
		0.000	**0.000**	**331**	**0.000**	**0.444**	**0.469**	**4.53**	**4.33**	**0.000**	**-52**	**12**	**20**
						0.886	0.469	4.12	3.96	0.000	-46	6	18
						0.939	0.469	4.04	3.89	0.000	-58	14	14
		0.000	**0.000**	**575**	**0.000**	**0.755**	**0.469**	**4.26**	**4.09**	**0.000**	**-14**	**44**	**0**
						0.811	0.469	4.21	4.04	0.000	-4	46	6
						0.994	0.480	3.84	3.71	0.000	6	44	6
		0.000	**0.000**	**556**	**0.000**	**0.811**	**0.469**	**4.21**	**4.04**	**0.000**	**40**	**-18**	**8**
						0.949	0.469	4.02	3.87	0.000	58	-30	36
						0.987	0.469	3.89	3.75	0.000	56	-16	12
		0.074	**0.021**	**145**	**0.001**	**0.854**	**0.469**	**4.16**	**4.00**	**0.000**	**-56**	**-32**	**24**
						1.000	0.773	3.13	3.05	0.001	-58	-44	28
						1.000	0.791	3.06	2.99	0.001	-50	-40	30
		0.084	**0.021**	**141**	**0.001**	**0.894**	**0.469**	**4.11**	**3.95**	**0.000**	**-22**	**58**	**20**
		0.084	**0.021**	**141**	**0.001**	**0.945**	**0.469**	**4.03**	**3.88**	**0.000**	**-14**	**20**	**0**
						0.998	0.521	3.77	3.65	0.000	-20	10	-10
		0.010	**0.005**	**214**	**0.000**	**0.965**	**0.469**	**3.98**	**3.84**	**0.000**	**-50**	**36**	**10**
						0.974	0.469	3.95	3.81	0.000	-52	36	2
						0.983	0.469	3.91	3.78	0.000	-40	48	12

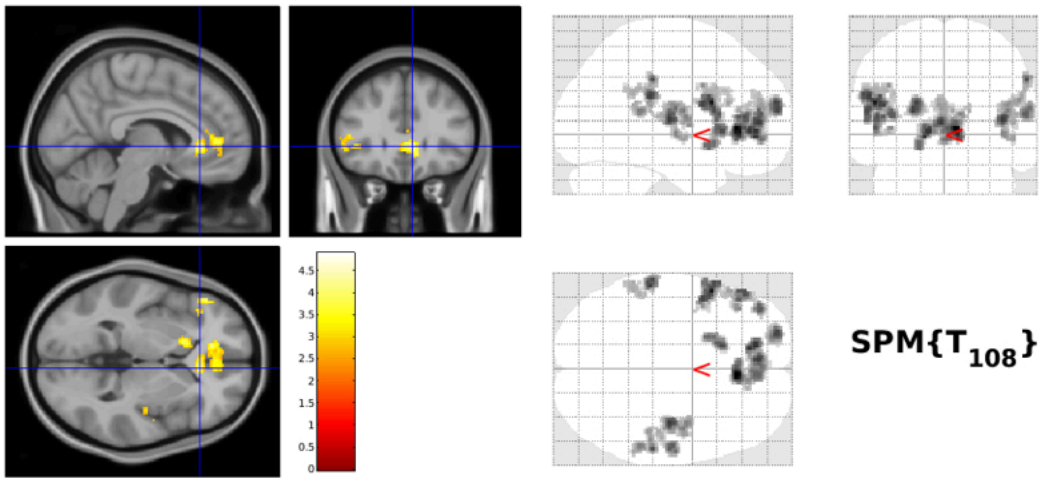


Figure 3.30. Statistical results from a direct comparison between the BLT vs. ALT condition for the BMAT Fear Task at post-treatment. Data are height thresholded at $p < .005$ (uncorrected), with a cluster correction ($p < .05$, FDR whole brain cluster corrected). The top table provides the MNI statistics and MNI coordinates for the primary clusters that emerged as showing significantly greater activation for the BLT versus ALT condition. The bottom figures show the spatial location of the activation clusters. Overall, the findings suggest that BLT produced significantly greater activation than ALT following 6-weeks of light treatment, particularly within hypothesized medial prefrontal regions associated with regulation of emotion, dorsolateral prefrontal regions involved in attention processing, and insular regions involved in interoceptive awareness of emotional sensations.

Within Group Changes over Treatment. To further evaluate this effect, conducted specific contrasts to evaluate the simple effect magnitude of change from baseline to post-treatment between the two light conditions within hypothesized regions of interest.

First, we constrained our search territory to the ACC using the PickAtlas Utility in SPM12. The change in activation from pre-treatment to post-treatment was calculated as a contrast image for each participant and these contrast images were then compared between light condition groups. As shown in Figure 3.31, we found that with an uncorrected height threshold of $p < .005$, with a cluster-wise small volume correction (FDR $p < .05$), we find bilateral increases in the rostral ACC region that are significantly greater among those who received the BLT than ALT. This analysis provides partial support to the hypothesis that BLT was associated with increased responsiveness to unconscious fear by activating emotional regulation regions of the brain relative to the ALT condition.

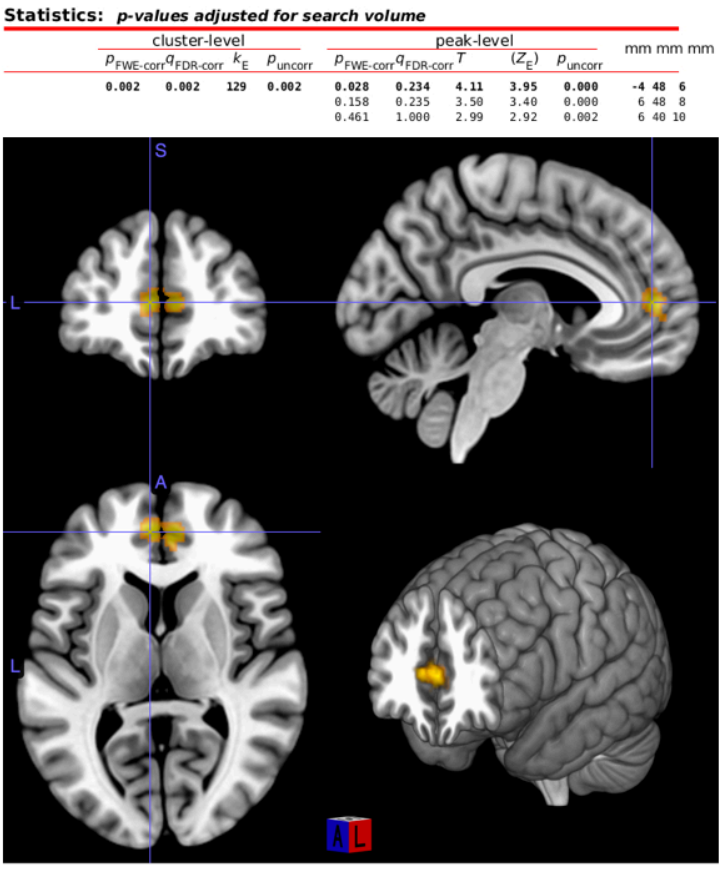


Figure 3.31. A simple-effects contrast constrained to the anterior cingulate cortex (ACC) revealed significantly greater increase in ACC activation from pre-to-post treatment for the BLT group relative to the ALT placebo group. Images are thresholded at $p < .005$ (uncorrected height) with a cluster correction (FWE small volume cluster correction $p < .05$).

Second, we tested the effect of BLT on changes in amygdala responses to the BMAT fear task. Prior work has suggested that the amygdala is particularly responsive to the fear condition of the BMAT. Therefore, we specifically examined the change in amygdala responses from pre-to-post-treatment for each group and then contrasted the magnitude of change. We hypothesized that the BLT group would show greater decreases in amygdala responses from pre-to-post treatment than the ALT group. However, at the standard thresholds used above (i.e., $p < .005$ uncorrected, with cluster correction at $p < .05$), we did not find any differences between groups. This argues against the hypothesis, suggesting that BLT had no significant effect on amygdala responses.

For the masked fear condition, these findings support Hypothesis 3a. As hypothesized, the BLT condition was associated with a significantly greater increase in medial prefrontal cortex activation but no evidence of reduced amygdala activation relative to the ALT group. Given that individuals with PTSD have been shown to demonstrate reduced prefrontal cortex activation and exaggerated amygdala responses to the BMAT Fear condition, these findings suggest that 6-weeks of daily morning BLT appears to successfully normalize higher order brain responses (e.g., ACC) to threatening stimuli in individuals with PTSD but may have limited effect on the amygdala.

Masked Happy

Omnibus ANOVA. This task was nearly identical to the BMAT Masked Fear trial, but employed facial expressions of happiness as the affective stimulus that was subsequently masked by a neutral expression (Figure 3.32). Other than the emotional valence of the expression, all other parameters were identical with the preceding task. As above, data were analyzed using a 2 (ALT vs. BLT) x 2 (Baseline vs. Post-Tx) repeated measures mixed ANOVA via the flexible factorial module of SPM12. As a first pass analysis, the interaction effect was interrogated at $p < .05$ (uncorrected) height threshold, with a FDR cluster correction (FDR corrected $p < .05$). As shown in Figure 3.33, this yielded only one significant cluster that showed a 2-way interaction between light conditions and time. As evident in the figure, the primary region of interaction was a large cluster in the right middle occipital gyrus/precuneus (MNI: x = 10, y = -48, z = 24). Follow-up analyses suggested that this interaction was driven by a slight decrease in activation within this region from pre-to-post-treatment for the placebo ALT group, and an increase in activation for the BLT group.

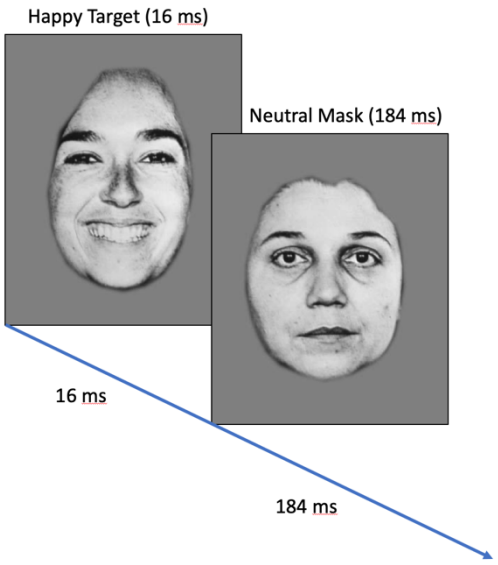


Figure 3.32. Happy Face Backward Masked Affect Task: A target emotional facial expression is presented for 16 ms and masked immediately by a neutral face for a longer duration (184 ms). This effectively prevents awareness of the target emotional expression, although it is perceived at a non-conscious level.

Statistics: ***p-values adjusted for search volume***

cluster-level				peak-level					
$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	F	(Z_E)	p_{uncorr}	mm mm mm
0.009	**0.010**	**662**	**0.000**	**0.731**	**0.379**	**20.17**	**4.14**	**0.000**	**10 -48 24**
				0.991	0.894	16.74	3.77	0.000	40 -52 24
				0.999	0.938	15.73	3.65	0.000	24 -56 22

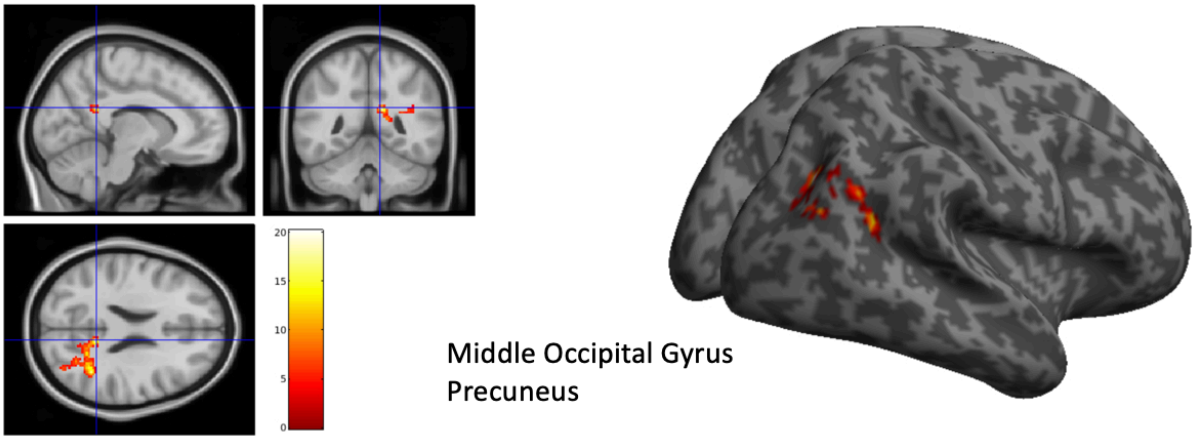


Figure 3.33. Omnibus 2(Blue vs. Amber) x 2(Baseline vs. Post-Tx) interaction analysis for the BMAT Masked Happy condition. Data are height thresholded at $p < .05$ (uncorrected), with a cluster correction ($p < .05$, FDR whole brain cluster corrected). The top image presents the quantitative outcomes of the statistical analysis and location data. The lower left figure shows the sagittal, coronal, and axial slice image at the peak voxel (x = 10, y = -48, z = 24). The bottom right image shows the cluster of activation on an inflated brain showing the posterior region of the right hemisphere.

Next we increased the threshold to p < .005, with an FDR cluster correction (p < .05). At this threshold, two clusters emerged as significant (see Figure 3.34). Overall, these findings suggest that for the BMAT happy task, BLT was associated with an increase in precuneus activation (a region involved in self-reflective cognition) and reduced responsiveness of the right insular cortex (a region involved in interoceptive processing).

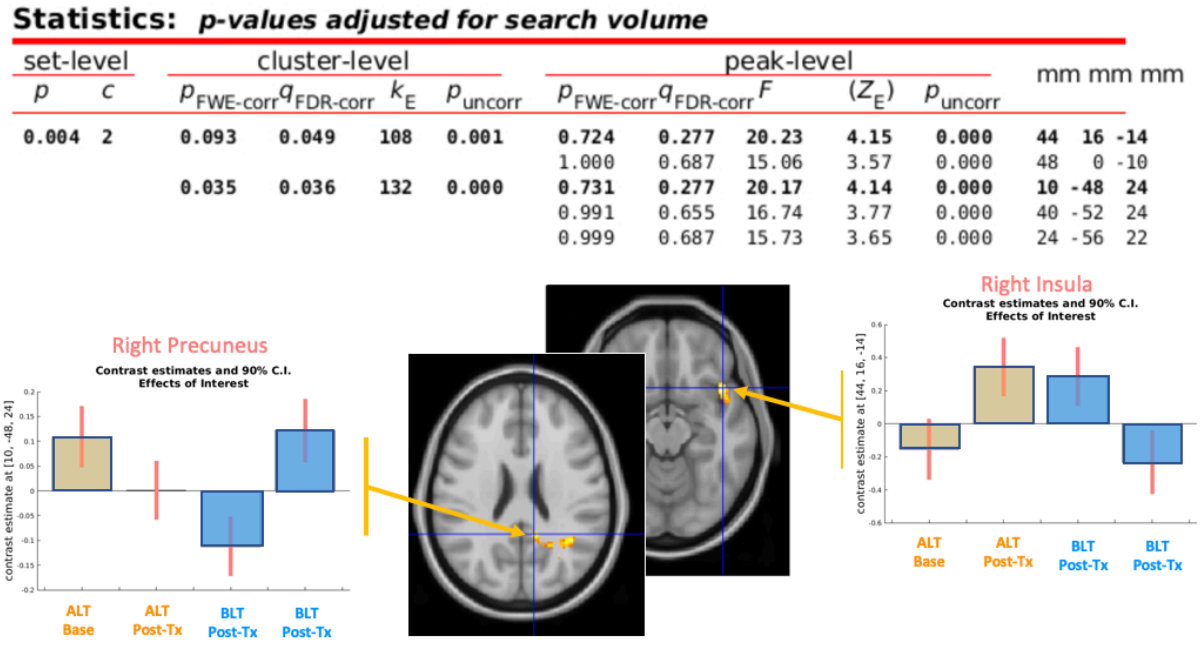


Figure 3.34. The BMAT Happy omnibus interaction analysis with a more liberal corrected threshold of p < .005 (uncorrected height) and p < .05, (whole brain FDR cluster corrected). The table shows regions of activation and significance. The bottom center images show the locations of activation along with corresponding plots showing the mean parameter estimates for the ALT and BLT groups before and after treatment.

Post Treatment Differences. We also directly compared the activation patterns between the ALT and BLT groups at post-treatment using a 2-sample t-test. As with the BMAT Fear condition, contrasted each group activation pattern with an uncorrected height threshold of $p < .005$, with a cluster-wise correction (FDR $p < .05$). However, no regions survived this level of statistical correction. We also compared the BLT > ALT contrast with an uncorrected height threshold of $p < .005$, with a cluster-wise correction (FDR $p < .05$), but again, no differences survived this correction for multiple comparisons.

Within Group Changes over Treatment. To further decompose the effects shown in the omnibus ANOVA, we conducted specific contrasts to evaluate the simple effect magnitude of change from baseline to post-treatment between the two light conditions. We examined this for the whole brain level and also within the hypothesized regions of interest (medial prefrontal regions and amygdala).

First, we conducted a whole brain analysis to identify the regions showing regions of where activation increased more from BLT than ALT from pre- to post-treatment. As shown in Figure 3.35, we found that BLT led to a greater increase in activation within the right middle occipital gyrus ($p < .005$ uncorrected height, $p < .05$ FWE whole brain cluster corrected) compared to ALT. This cluster was located in the same location identified in the omnibus ANOVA above.

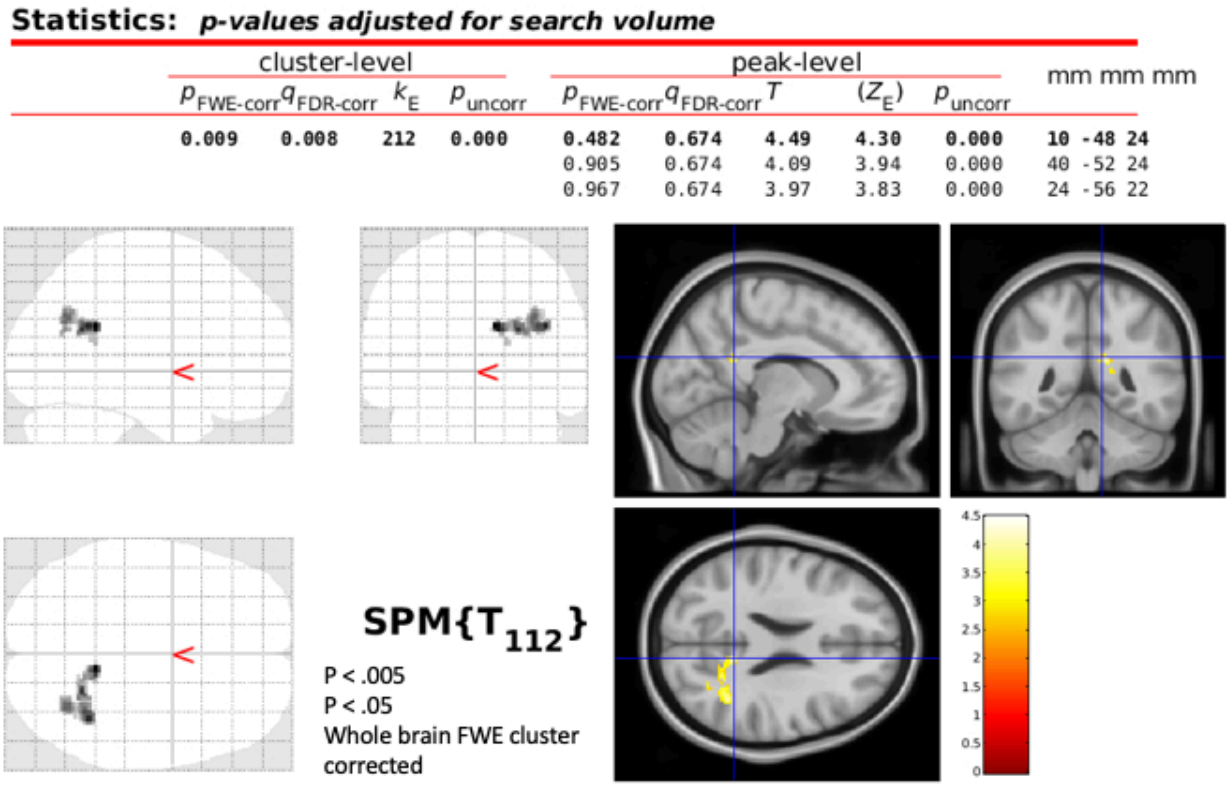


Figure 3.35. Regions that showed greater increase in activation over treatment for BLT than ALT during the BMAT Happy condition. Consistent with the findings from the omnibus ANOVA, BLT led to an increase in activation of the right middle occipital gyrus compared to ALT. The top table presents the statistical analyses and location data. The left figure is a maximum intensity projection (MIP) and the right image shows the location on a standard T1 brain.

Next, we constrained our search territory to the medial prefrontal cortex and, more specifically, to the ACC using the PickAtlas Utility in SPM12. The change in activation from pre-treatment to post-treatment was calculated as a contrast image for each participant and these contrast images were then compared between light condition groups. However, there was no effect within these prefrontal regions.

We then conducted the opposite analysis to examine regions that showed greater reduction in activation among those receiving BLT compared to ALT over the course of treatment. However, at the standard thresholds ($p < .005$ uncorrected height, $p < .05$ FDR whole brain cluster corrected), there were no significant regions that showed greater decreases in activation for BLT versus ALT.

Additionally, we tested the effect of BLT on changes in amygdala responses to the BMAT happy task. We specifically examined the change in amygdala responses from pre-to-post-treatment for each group and then contrasted the magnitude of change. We hypothesized that the BLT group would show greater decreases in amygdala responses from pre-to-post treatment than the ALT group. However, at the standard thresholds used above (i.e., $p < .005$ uncorrected, with cluster correction at $p < .05$), we did not find any differences between groups. Similar to the findings for BMAT Fear, this argues against the hypothesis, suggesting that BLT had no significant effect on amygdala responses.

For the masked happy condition, these findings did not support the direct expectations from Hypothesis 3a. Specifically, we did not find the hypothesized increase in prefrontal activation following BLT versus ALT. However, there was a clear effect of blue light at increasing activation within the right precuneus and reducing activation within the right insular cortex. The clinical significance of these effects remains to be determined.

Overall, the findings from the Fear and Happy BMAT support the global hypothesis that BLT normalizes brain responses to backward masked presentations of affective stimuli, particularly for prefrontal/ACC responses to masked fear faces. Future work will need to identify the clinical significance of these outcomes, but they are suggestive that this approach may be useful for regulating responses to unconsciously perceived negative affective stimuli.

***Hypothesis 3b*: Relative to ALT, six weeks of BLT will lead to significantly greater negative functional connectivity between the ventromedial prefrontal cortex and amygdala during resting state fMRI.**

As described in section 3.C.II, neuroimaging data were preprocessed and imported to CONN to compare resting state functional connectivity between conditions across treatment phase. 2x2 mixed ANCOVA interactions were conduction between light conditions across treatment phase, while controlling for sex and age, to assess the degree of change in functional brain activity during a six-minute resting state fMRI scan while participants allowed their mind to wander. In total, 1 participant is missing the baseline scan, and 8 are missing the post-treatment scan. Additionally, 4 individuals had excess movement during their scan and had to be excluded. This yielded 71 cases with complete pre-and-post-treatment scans.

ROI-to-ROI

Second-level analyses were conducted by placing regions of interest (ROIs) in anatomical areas as specified by the AAL3 atlas, which included bilateral regions of the amygdala, as well as vmPFC (medial orbitofrontal cortex, superior medial prefrontal cortex, gyrus rectus, and subgenual anterior cingulate cortex) see Figure 3.36 to the right. However, at the standard thresholds for parametric multivariate statistics for ROI-level inferences ($p < .05$ ROI-level p-FDR corrected (MVPA omnibus test); connection threshold, $p < .01$ p-uncorrected) (BENJAMINI & Hochberg 1995) there were no significant regions that showed changes in connectivity between regions for BLT versus ALT. Even when investigating outcomes at the liberal threshold of .05 uncorrected at the ROI level, no associated changes were observed.

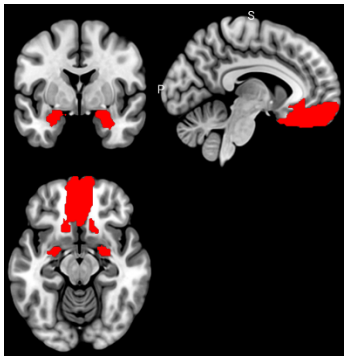


Figure 3.36. Regions included in the initial ROI based analysis. Regions include the amygdala, medial orbitofrontalcortex, superior medial prefrontal cortex, gyrus rectus, and subgenual

At the standard thresholds for parametric multivariate statistics for ROI-level inferences described above, we observed significant increases in functional connectivity between the primary visual cortex (calcarine cortex, medial node of the visual network) and the salience network (right supramarginal gyrus and right insula), as well as the language network (right posterior superior temporal gyrus), $F(5,63) = 4.69$, $p = .001$ (uncorrected) $p = .03$ (FDR corrected), Figure 3.37.

See Figure 3.38 below for pre-post effect sizes between significant ROIs.

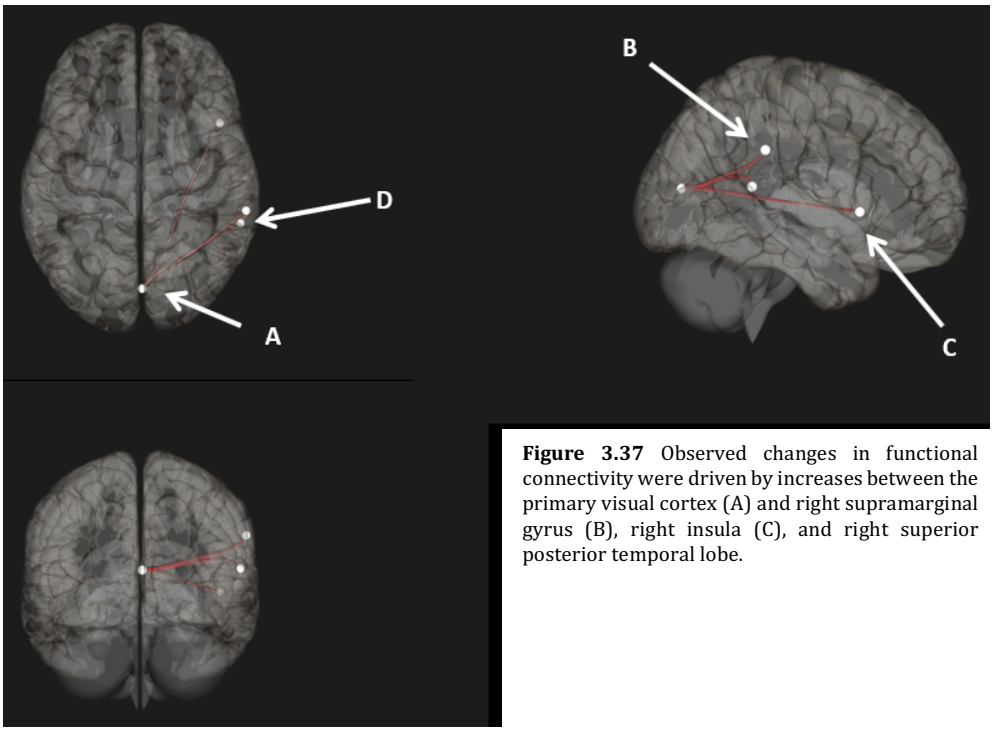
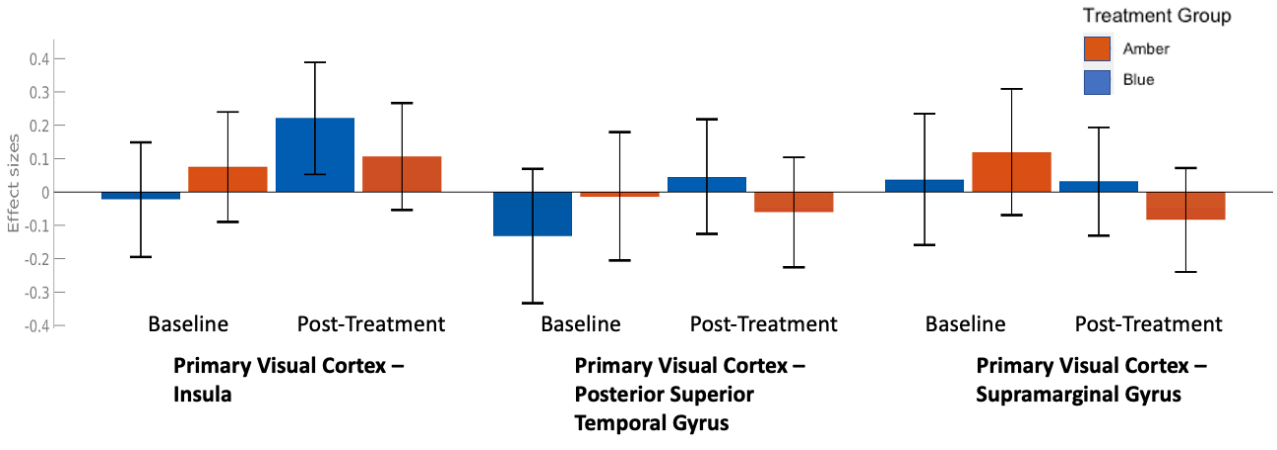


Figure 3.37 Observed changes in functional connectivity were driven by increases between the primary visual cortex (A) and right supramarginal gyrus (B), right insula (C), and right superior posterior temporal lobe.



ROI 1/30 Networks.Visual.Medial	F(5,63) = 4.69	0.001052	0.031563	
Connection Networks.Visual.Medial (2,-79,12)-Networks.Salience.AInsula (R) (47,14,0)	T(67) = 3.54	0.000731	0.021188	
Connection Networks.Visual.Medial (2,-79,12)-Networks.Language.pSTG (R) (59,-42,13)	T(67) = 3.21	0.002031	0.029452	
Connection Networks.Visual.Medial (2,-79,12)-Networks.Salience.SMG (R) (62,-35,32)	T(67) = 2.81	0.006437	0.062227	

Figure 3.38. Plots of the effect sizes observed between regions, and the observed relationships demonstrated similar trends, with increases in connectivity for subjects with BLT in conjunction with decreases for subjects with ALT.

While investigating the influence of potentially meaningful covariates related to trauma history, we found that including trauma exposure type in the model (indirect vs direct) a separate cluster of ROIs demonstrating decreases in connectivity between nodes for individuals in the BLT condition relative to ALT was observed. We found accounting for variance related to trauma exposure revealed decreases in connectivity between the left supramarginal gyrus of the salience network with the medial prefrontal cortex of the default mode network, right inferior frontal gyrus of the language network, as well as the right lateral sensorimotor cortex, F(5,62) = 4.30, p =.002 (uncorrected) p =.03 (FDR corrected), see Figure 3.39, as well as Figure 3.40 for pre-post effect sizes between significant ROIs.

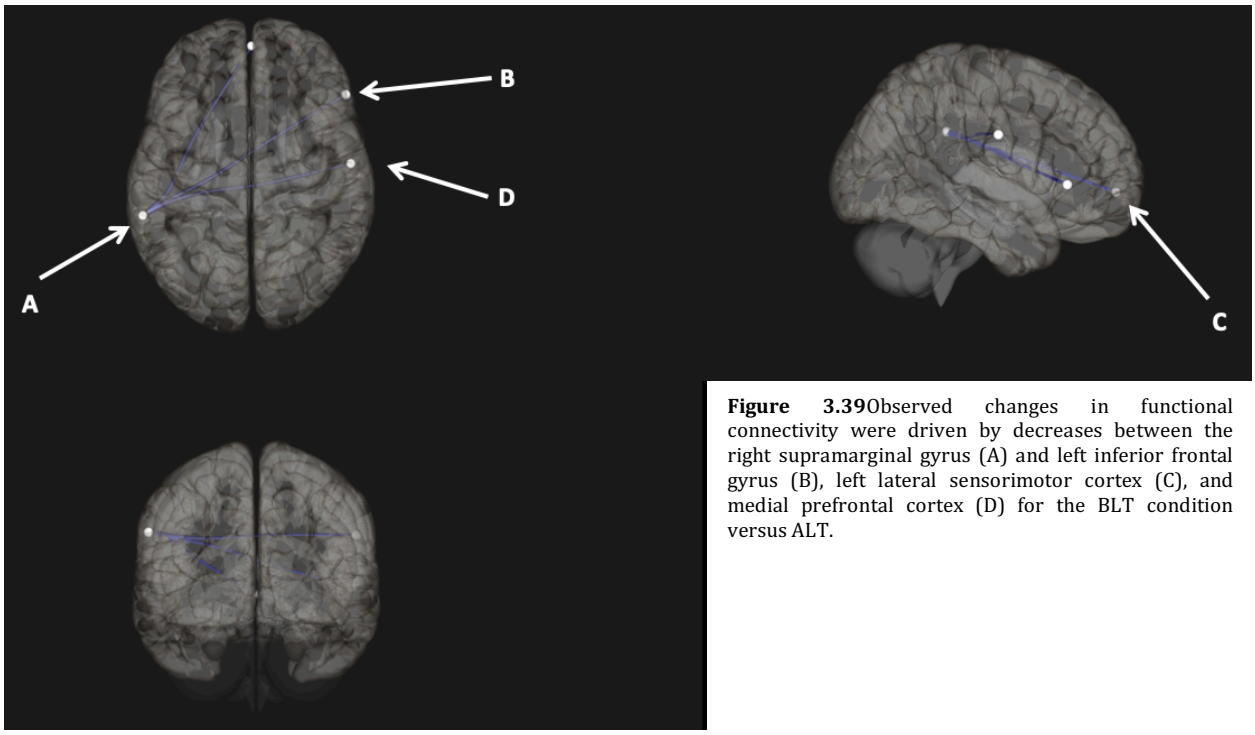
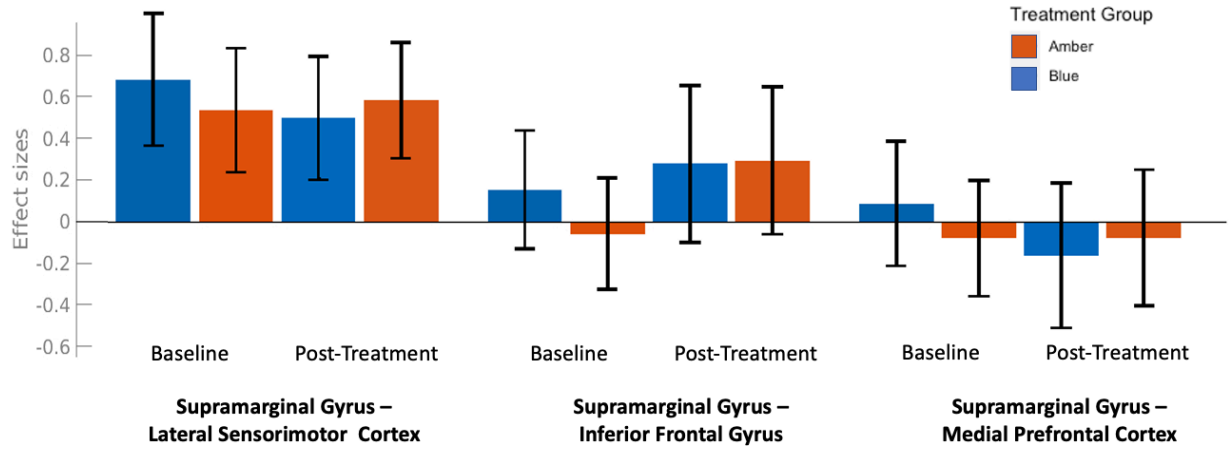


Figure 3.39 Observed changes in functional connectivity were driven by decreases between the right supramarginal gyrus (A) and left inferior frontal gyrus (B), left lateral sensorimotor cortex (C), and medial prefrontal cortex (D) for the BLT condition versus ALT.



ROI 2/30 Networks.Salience.SMG l	F(5,62) = 4.30	0.002024	0.030366	
Connection Networks.Salience.SMG (L) (-60,-39,31)-Networks.SensoriMotor.Lateral (R) (56,-10,29)	T(66) = -3.03	0.003449	0.044394	
Connection Networks.Salience.SMG (L) (-60,-39,31)-Networks.Language.IFG (R) (54,28,1)	T(66) = -2.99	0.003969	0.044394	
Connection Networks.Salience.SMG (L) (-60,-39,31)-Networks.DefaultMode.MPFC (1,55,-3)	T(66) = -2.93	0.004592	0.044394	

Figure 3.40. Plots of the effect sizes observed between regions, and the observed relationships demonstrated similar trends, with decreases in connectivity for subjects with BLT in conjunction with increases for subjects with ALT.

Interaction Effects Related to Anxiety Symptoms, Study Phase, and Light Condition

We found there was a significant interaction between decreases in insular activation during the fear recall and changes in state anxiety symptoms across study phase when incorporated into a mixed model. When activation in the left insula during fear recall was incorporated into the mixed effects model, we observed a positive interaction effect on state anxiety, (beta = 11.05, 95% CI [1.68, 20.41], t(87) = 2.31, p = 0.021; Std. beta = 0.63, 95% CI [0.10, 1.16]). As shown in Figure 3.42, subjects in the BLUE light condition with the lowest levels of activation demonstrated trending decreases in state anxiety across the intervention, while the opposite effect was observed for individuals in ALT.

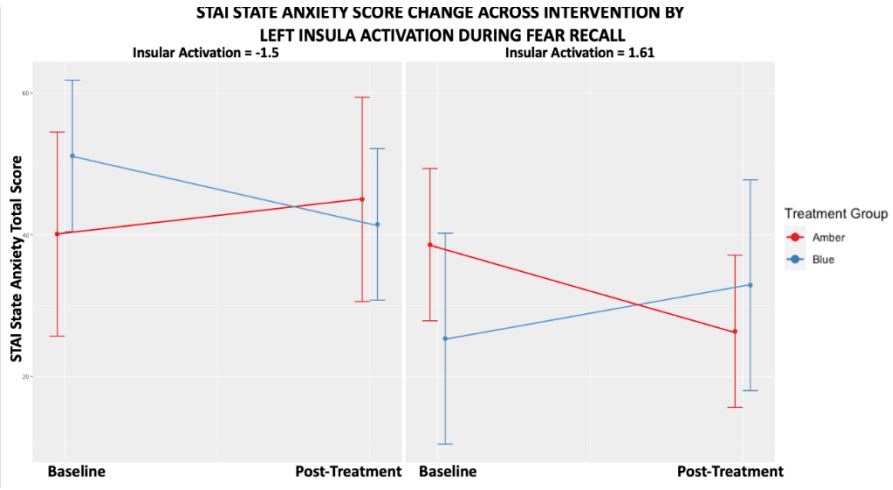


Figure 3.42 Improvements across time in state-anxiety symptoms as a function of activation of the left Insula during the fear recall task. Individuals between treatment groups demonstrated inverse relationships between levels of activation in this region and changes in state-anxiety symptoms. Future work is necessary to help understand the relationship between activity in this region relative to safety learning in the contexts of BLT.

While non-significant, we also observed interesting trends related to interactions between increases in connectivity and anxiety outcomes when incorporated into mixed models described in sections above, with study phase and light condition. When incorporating the changes in connectivity between the primary visual cortex and the posterior superior temporal gyrus into the mixed effects model, we observed a negative trend in the interaction effect on trait anxiety, (beta = -18.23, 95% CI [-37.33, 0.88], t(127) = -1.87, p = 0.062; Std. beta = -0.41, 95% CI [-0.84, 0.02]). As shown in Figure 3.43, subjects in the BLT light condition with the lowest levels of connectivity were the only subjects between conditions to not experience decreases in levels of trait anxiety across the intervention. While the relationship remains unclear, the association should be investigated in future interventions investigating changes in anxiety-based symptoms.

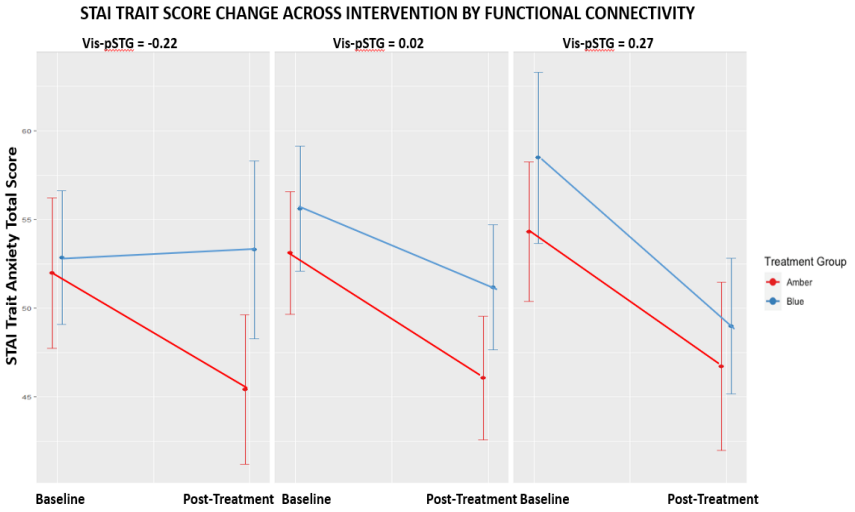


Figure 3.43 Improvements across time in trait-anxiety symptoms as a function of light condition and functional connectivity between the primary visual cortex posterior superior temporal gyrus; plots are separated at the mean by one standard deviation for visualization purposes. Individuals with the lowest levels of functional connectivity between these regions demonstrated the least amount of change in trait anxiety symptoms for individuals in BLT relative to ALT.

We found an intriguing interaction related to decreased functional outcomes between changes in connectivity between the supramarginal gyrus of the salience network and the inferior frontal gyrus node of the language network with anxiety outcomes

based on the STAI when incorporated into mixed models described in sections above, relative to study phase and light condition. When incorporating the changes in connectivity between these areas, we observed a trending decreases in the interaction effect on trait anxiety for individuals in the BLT condition with the lowest levels in connectivity between these regions, (beta = 42.26, 95% CI [10.93, 73.58], t(127) = 2.64, p = 0.008; Std. beta = 0.60, 95% CI [0.16, 1.05]). As show in Figure 3.44, subjects in the BLUE light condition with the lowest levels of connectivity demonstrated decreases in levels of state and trait anxiety across the intervention, while greater levels of connectivity inversed this trend. Individuals in the ALT with the greatest levels of connectivity also demonstrated relative decreases in anxiety compared to individuals in that treatment condition.

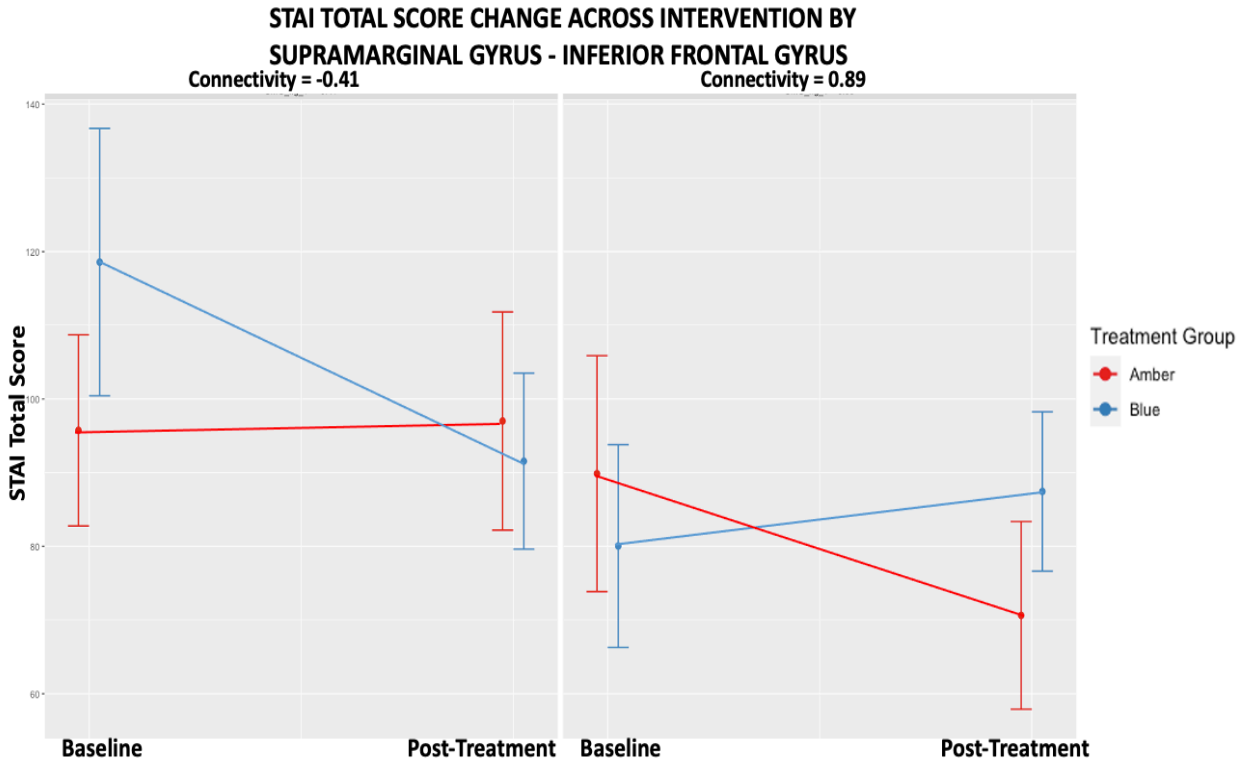


Figure 3.44. Improvements in anxiety symptom presentations varied as a function of light condition and time by resting-state connectivity between the supramarginal gyrus and inferior frontal gyrus. Individuals with lower levels of connectivity in the BLT condition had trending improvements in anxiety levels, as measured by the STAI, while the ALT had relatively no change; on the other hand, individuals in ALT with the highest levels of connectivity demonstrated trending decreases in anxiety relative to trending increases for BLT.

We observed a similar interaction effect between changes in connectivity between the supramarginal gyrus and the medial prefrontal cortex node of the default mode network with anxiety outcomes based on the BAI when incorporated into mixed models. When incorporating the changes in connectivity between these areas, we observed a trending positive interaction effect on anxiety levels for individuals in the BLT condition with the lowest levels in connectivity between these regions, (beta = 23.00, 95% CI [4.00, 41.99], t(129) = 2.37, p = 0.018; Std. beta = 0.54, 95% CI [0.09, 0.98]). As show in Figure 3.45, subjects in the BLUE light condition with the lowest levels of connectivity demonstrated decreases in levels of state and trait anxiety across the intervention, while greater levels of connectivity inversed this trend. Individuals in the ALT with the greatest levels of connectivity also demonstrated relative decreases in anxiety compared to individuals in that treatment condition While the relationship remains unclear, the associations between decreases in connectivity between the salience network and other functionally

separate networks should be explored in future interventions investigating changes in anxiety-based symptoms.

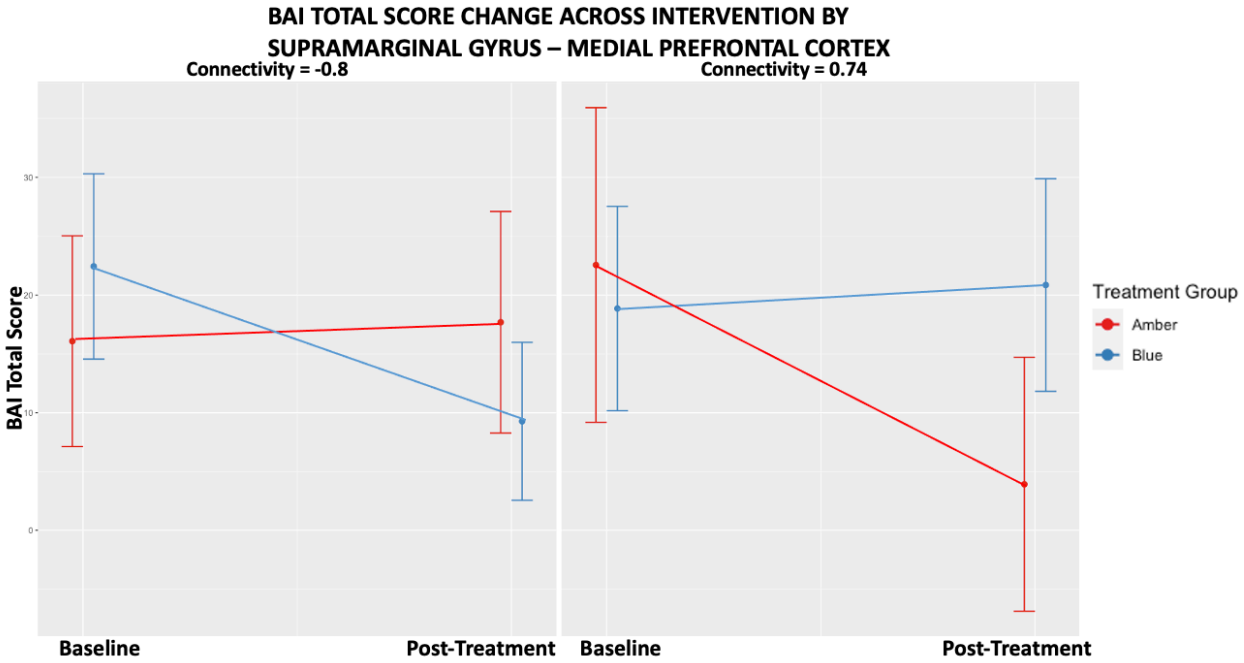


Figure 3.45. Improvements in anxiety symptom presentations varied as a function of light condition and time by resting-state connectivity between the supramarginal gyrus and medial prefrontal cortex. Individuals with lower levels of connectivity in the BLT condition had trending improvements in anxiety levels, as measured by the BAI, while the ALT had relatively no change; on the other hand individuals in ALT with the highest levels of connectivity demonstrated trending decreases in anxiety relative to trending increases for BLT.

Seed-to-Voxel Analyses

Second-level, seed-to-voxel analyses were performed to create statistical parametric maps representing functional connectivity between a seed ROI and the rest of the brain. Two separate seed-to-voxel analyses were conducted for the 7 ROIs shown in Figure 3.36 above; the first analysis incorporated bilateral regions of the amygdala, and the second and the second analysis incorporated regions of the vmPFC. Two-way analyses of covariance (ANCOVAs) were used to investigate the main effect of group on functional connectivity across time, with participant age and sex included as covariates in the models. Statistical parametric maps for each seed ROI were defined using thresholds of two-tailed, voxel-wise $p < .01$ and cluster-level $p < .05$, false discovery rate (FDR) corrected, to identify voxel-wise clusters associated with significant changes in functional connectivity. No significant clusters were identified by either analysis.

For changes in resting-state functional connectivity, these findings did not support the direct expectations from Hypothesis 3b. Specifically, we did not find the hypothesized negative functional connectivity between the vmPFC and amygdala following BLT versus ALT. However, there was a clear effect of blue light at increasing connectivity within the primary visual cortex and the supramarginal gyrus and insula within the salience network, as well as the posterior superior temporal gyrus in the language network. The clinical significance of these effects remains to be determined and future work will need to identify the clinical significance of the network connectivity level outcomes, but they are suggestive that BLT does influence rsFC when compared to ALT.

***Hypothesis 3c*: Relative to ALT, six weeks of BLT will lead to significantly increased activation of the ventromedial and dorsolateral prefrontal cortex and reduced hippocampal activation during the fMRI memory suppression task.**

When this project was initially funded, we had proposed to use a recently developed functional neuroimaging task to assess the ability to regulate memory formation in the hippocampus. The proposed task was the Memory Suppression Task (MST), which involves training the participant to remember traumatic images that are paired with specific faces. Then the individual is later exposed to the faces while in the neuroimaging scanner and is asked to intentionally suppress mental images of the associated traumatic scenes for half of the faces, while actively recalling the others. Prior research suggested that this task produced a significant inability to voluntarily recall the previously suppressed images, which was associated with greater activation of the prefrontal cortex (Depue et al., 2006; Depue et al., 2007). Such findings were taken as evidence of a learned suppression of the images.

As we were starting up this study, we found that the Memory Suppression Task, which was originally developed with healthy individuals, was too taxing on our participants with PTSD. The numerous repetitions of the traumatic images and the lengthy testing in the scanner were found to be aversive to many of our participants. Further, in our preliminary data using the task in healthy individuals, we found that most people failed to show significant suppression of the memories (Smith et al., 2018). Thus, due to the low tolerability the task and evidence that it was difficult to obtain an effect, we discontinued this task in the interest of the wellbeing of our participants.

In place of the MST, we included second condition of the BMAT described above. The initial version focused only on masked fearful faces, while the added trial now also includes masked presentations of happy faces. Please refer to the section under Hypothesis 3a above for these analyses.

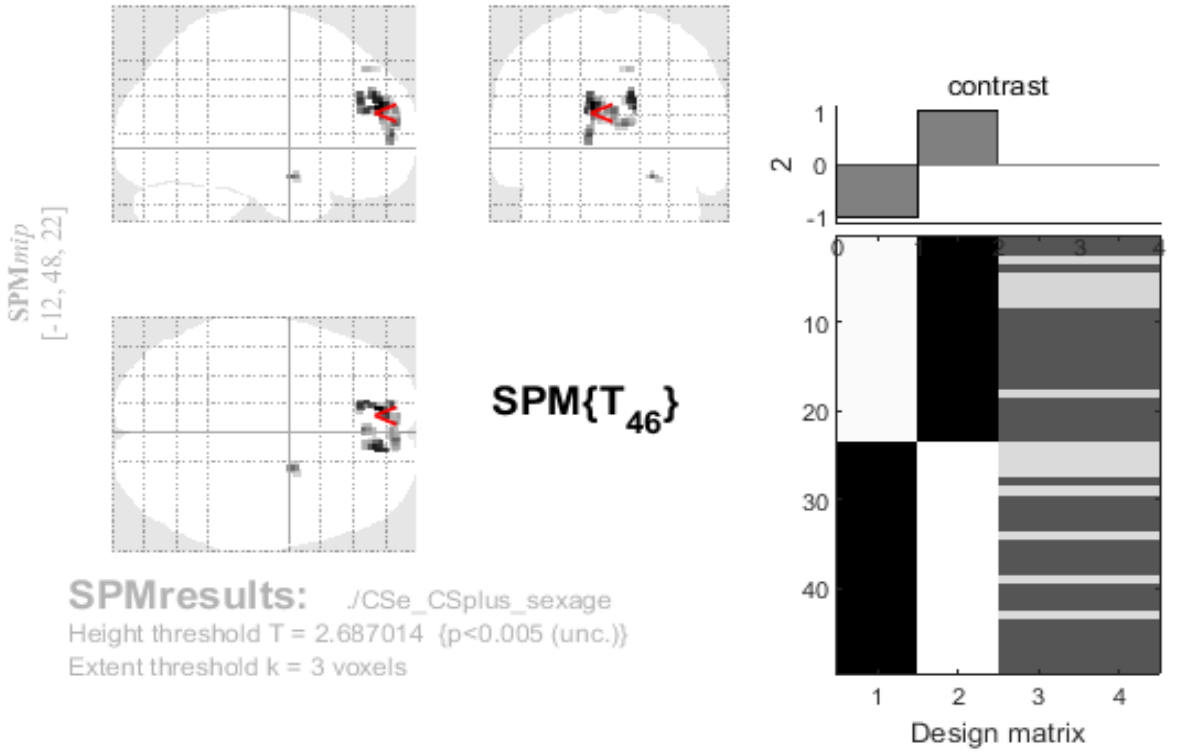
***Hypothesis 3d*: Relative to ALT, six weeks of BLT will be associated with increased activation of the VMPFC, and reduced activation within the amygdala and dorso-medial prefrontal cortex during the extinction recall scan.**

Panel D of Figure 3.7 above shows that the final phase of the fear conditioning paradigm was to examine brain activation patterns to the same stimuli during functional magnetic resonance imaging (fMRI). An important consideration is that before the fMRI scan, the CS+ image (e.g., red vehicle) was also "extinguished" as part of the standard fear conditioning protocol to ensure no latent adverse experiment effects related to a sustained conditioned fear response. Following the final extinguishing phase, participants reported not expecting a shock to any stimuli/context presentation administered.

While undergoing a later fMRI, participants were shown a new set of images that included the three previously seen target stimuli (i.e., blue truck, red car, yellow school bus), without any new shocks but in a completely novel situation. Prior studies have demonstrated adequate sleep is critical to context generalization following safety learning, in that the fear-conditioned response can sustain when the previous CS+ stimuli are shown in a novel visual context (e.g., forest road). The stimuli were shown in a new visual context. Scanning occurred on a 3T Siemens Skyra MRI scanner. Contrasts were created that directly compared brain activation patterns from the previously extinguished stimuli (CS+E; blue truck) versus the never extinguished stimuli (CS+; red car) and non-conditioned stimuli (CS-, yellow bus). These contrast maps were then compared at post treatment between the BLUE and AMBER conditions. Initial analyses focused on the three regions identified in our initial hypotheses, the ventromedial prefrontal cortex (vmPFC; a region associated with the regulation of fear responses), the dorso-medial

prefrontal cortex (dmPFC; a region associated with attention and memory and working memory), and the amygdala (a region associated with threat detection). Based on prior research by Milad and colleagues (2009), we then extended our analyses to include regions of interest comprising a more complete model of the fear neurocircuitry, including the dorsal anterior cingulate cortex (dACC; a region associated with the expression of fear memories), the hippocampus (a region associated with contextual fear memory), and the insula (a region associated with the mediation of context threat).

In total, 1 participant did not demonstrate fear-based learning; 9 participants had unusable scans and an additional 18 participants were excluded due to excess movements during the post-treatment scan. This yielded 48 cases with complete pre- and post-treatment scans. As the sample was underpowered relative to the targeted size identified in our power analysis, we employed a more liberal threshold ($p < .005$, uncorrected), and utilized extent threshold correction. We found significant activation differences



Statistics: ***p-values adjusted for search volume***

set-level		cluster-level				peak-level					mm	mm	mm
p	c	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}			
0.106	6	0.035	0.028	152	0.008	0.350	0.396	3.81	3.53	0.000	-12	48	22
						0.565	0.396	3.53	3.30	0.000	-14	38	26
						0.777	0.400	3.26	3.08	0.001	6	58	12
		0.402	0.506	46	0.113	0.478	0.396	3.64	3.39	0.000	10	46	28
						0.534	0.396	3.57	3.34	0.000	12	52	22
		0.743	0.506	19	0.298	0.652	0.396	3.43	3.22	0.001	-14	56	6
		0.684	0.506	23	0.253	0.772	0.400	3.27	3.08	0.001	0	40	20
		0.832	0.506	13	0.391	0.794	0.400	3.24	3.06	0.001	22	0	-18
		0.888	0.506	9	0.479	0.954	1.000	2.91	2.77	0.003	8	42	44

Figure 3.46. Regions that showed greater increase in activation over treatment for ALT than BLT during the Fear Conditioning Recall Task. BLT led to an increase in activation of vmPFC and decreased activation in the amygdala and dlPFC compared to ALT. The bottom table presents the statistical analyses and location data. The left figure is a maximum intensity projection (MIP) and the right image shows the design matrix.

between the light groups in the targeted regions, with effects observed in the vmPFC and amygdala, see Figure 3.46. This suggests that the observed differences in retention of extinction memory produced by BLUE light are due in part to greater top-down inhibition or activation of the vmPFC region of the brain relative to the amygdala and dmPFC activation.

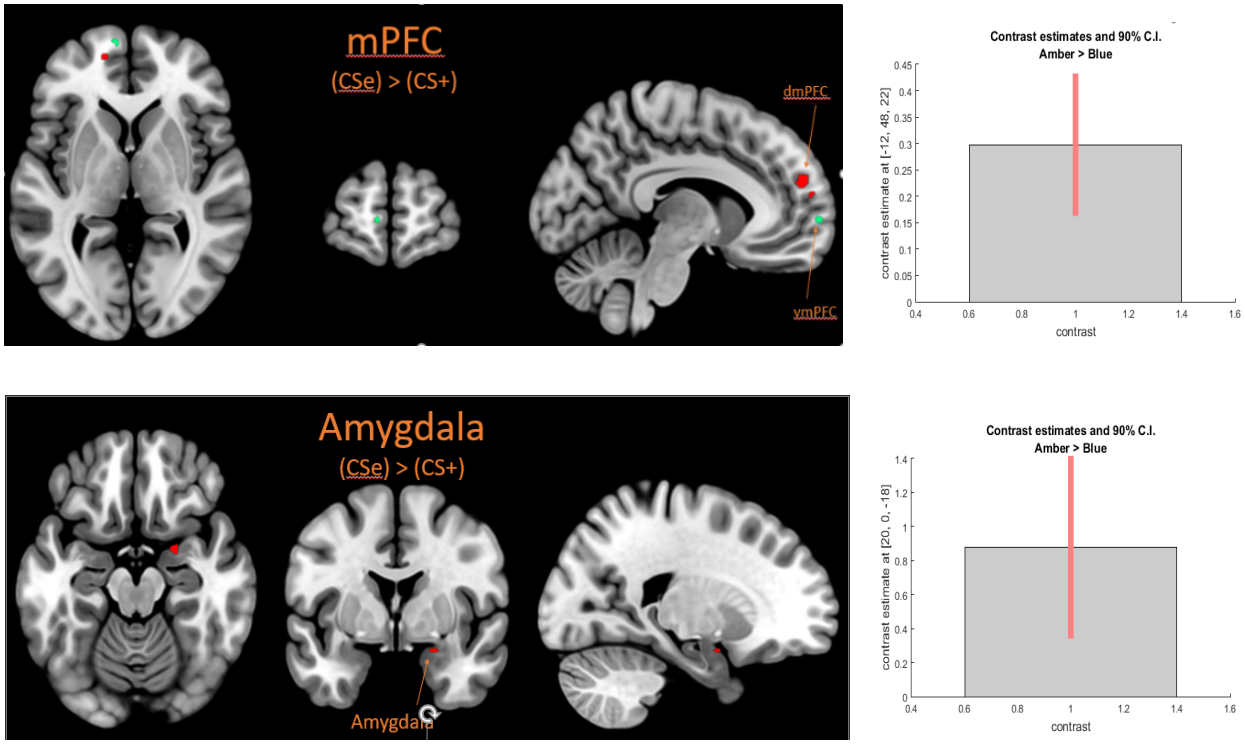


Figure 3.47. The contrast between extinguished (CS+E) versus unextinguished (CS+) was compared between the BLUE and AMBER conditions at post-treatment. Participants in the blue light condition showed a significant reduction of activation in the ventral-medial prefrontal cortex vmPFC, green), while participants in the AMBER condition showed a significant increase of activation in the dorso-medial prefrontal cortex (dmPFC, red).

As shown in Figure 3.47, we found that BLUE light led to a significantly greater reduction of activation within the dmPFC and right amygdala when viewing previously feared stimuli compared to the AMBER, as well as increased activation of vmPFC. This finding suggests that BLUE light may be inhibiting fear memory expression when individuals see a previously extinguished CS in conjunction with the inhibition of the threat response within the primary salience/threat detecting regions of the brain. Between group contrasts interrogating extinction relative to non-conditioned (CSe)>(CS-) and extinction relative to a pixelated control image derived from all stimuli presentations did not reveal any significant between group differences in brain activation. Overall, these findings suggest that BLUE wavelength light therapy appears to be enhancing the consolidation of fear extinction memories and reducing activation within the fear neurocircuitry of the brain to previously feared stimuli in novel contexts, demonstrating successful "safety learning".

Second, we compared the BLUE and AMBER groups investigating activation with ROIs extended to include regions of interest comprising a more complete model of the fear neurocircuitry. As shown in Figure 3.48 (right and below), we found that the BLUE light condition was also associated with significant reductions of activation within bilateral regions of the dACC, hippocampus, and insula compared to the AMBER light condition. This finding suggests that BLUE light may be inhibiting fear memory expression when individuals see a previously extinguished CS conditioning, within the hippocampus, a region typically associated with greater activation in response to contextual cues associated with fear memory conditioning. Similar to the findings above, we observed that BLUE light was associated with decreased activation within the right hippocampus compared to AMBER placebo light, $p < .05$, FDR corrected; see Figure 3.49 and Figure 3.50 below). This finding raises the possibility that BLUE light was associated with suppression of fear renewal when the previously feared but extinguished stimulus was seen in the new visual context, which may indicate improvements in REM sleep architecture that prior research demonstrates the generalization of safety-based learning to novel contexts (Lerner et al., 2017; Lerner et al., 2021; Marshall et al., 2014).

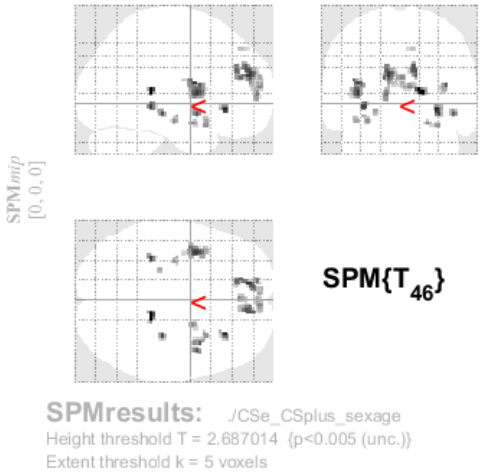


Figure 3.48. A maximum intensity projection (MIP) with ROIs of interest extended to more fully encompass anatomical areas associated with fear based responding and learning.
Contrast Blue > Amber, CSe > CS+.

Statistics: *p-values adjusted for search volume*

set-level		cluster-level				peak-level					mm	mm	mm
p	c	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}			
0.000	17	0.906	0.506	19	0.298	0.211	0.329	4.24	3.88	0.000	18	-36	8
		0.854	0.476	24	0.243	0.409	0.329	3.93	3.63	0.000	30	28	-6
		0.061	0.476	152	0.008	0.509	0.329	3.81	3.53	0.000	-12	48	22
						0.750	0.341	3.53	3.30	0.000	-14	38	26
						0.920	0.461	3.26	3.08	0.001	6	58	12
		0.116	0.476	121	0.016	0.518	0.329	3.80	3.53	0.000	-38	4	8
						0.543	0.329	3.77	3.50	0.000	-38	2	16
						0.998	1.000	2.82	2.70	0.004	-36	-8	18
		0.924	0.506	17	0.325	0.540	0.329	3.78	3.51	0.000	-34	-36	-4
		0.932	0.506	16	0.340	0.616	0.329	3.69	3.43	0.000	32	-26	-10
		0.591	0.476	46	0.113	0.660	0.329	3.64	3.39	0.000	10	46	28
						0.719	0.329	3.57	3.34	0.000	12	52	22
		0.924	0.506	17	0.325	0.715	0.329	3.57	3.34	0.000	44	4	-10
		0.843	0.476	25	0.234	0.722	0.341	3.57	3.33	0.000	38	6	14
		0.906	0.506	19	0.298	0.829	0.405	3.43	3.22	0.001	-14	56	6
		0.865	0.476	23	0.253	0.917	0.461	3.27	3.08	0.001	0	40	20
		0.955	0.506	13	0.391	0.931	0.466	3.24	3.06	0.001	22	0	-18
		0.986	1.000	7	0.537	0.937	0.466	3.22	3.04	0.001	32	12	-20
		0.955	0.506	13	0.391	0.943	0.480	3.21	3.03	0.001	-30	-16	-16
		0.989	1.000	6	0.570	0.975	0.584	3.09	2.93	0.002	-24	-28	-8
		0.973	0.506	10	0.454	0.976	0.584	3.08	2.92	0.002	-40	12	-16
		0.978	0.506	9	0.479	0.995	0.732	2.91	2.77	0.003	8	42	44

Figure 3.49. The table shows regions of activation and significance for the extended ROI analysis. Contrast Amber > Blue, CSe > CS+.

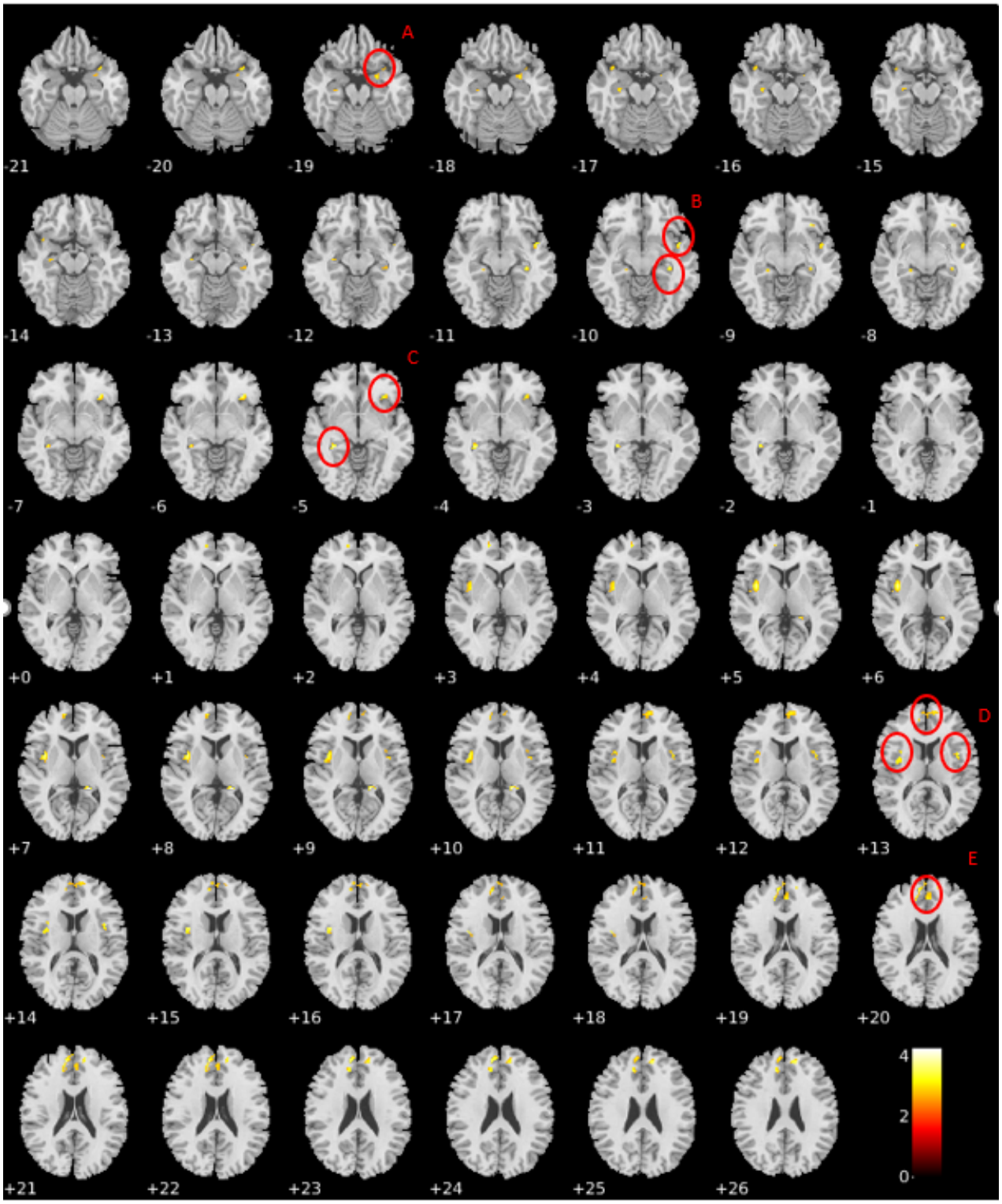


Figure 3.50. The contrast between extinguished (CS+E) versus non-extinguished (CS+) was compared between the blue and amber placebo conditions at post-treatment. Participants in the BLUE light condition showed a significant reduction of activation in the right amygdala (A), right hippocampus and right insula (B), left hippocampus and right insula (C), dorso-medial prefrontal cortex (dmPFC) and right insula (D), as well as dorsal anterior cingulate gyrus (dACC) (E), No additional areas of interest showed increased activation for the blue light condition when compared to amber.

Interaction Effects Related to Extinction Recall Neuroimaging Findings, Study Phase, and Light Condition

The first eigenvariate representing total combined activation from the significant clusters identified were extracted from the blue and amber group weighted contrasts respectively and interrogated for associated changes at behavioral levels across study phase by entering the extracted activations of each of these clusters as a third interaction term with group and time.

Changes in levels of depression, as measured by the BDI, varied across study phase and light condition by the degree of activation in the vmPFC during the fear extinction recall task. We found a significant negative interaction effect on study phase by group, (beta = -12.09, 95% CI [-20.22, -3.96], t(86) = -2.92, p = 0.004; Std. beta = -0.74, 95% CI [-1.24, -0.24]). As show in Figure 3.51, subjects in the BLT condition with highest levels of vmPFC actication, had greater decreases in depression related symptoms on the BDI, while subjects in the ALT group were observed to have the opposite trend. This suggests the possibility that BLUE light therapy may be more effective for individuals suffering greater levels of comorbid depression.

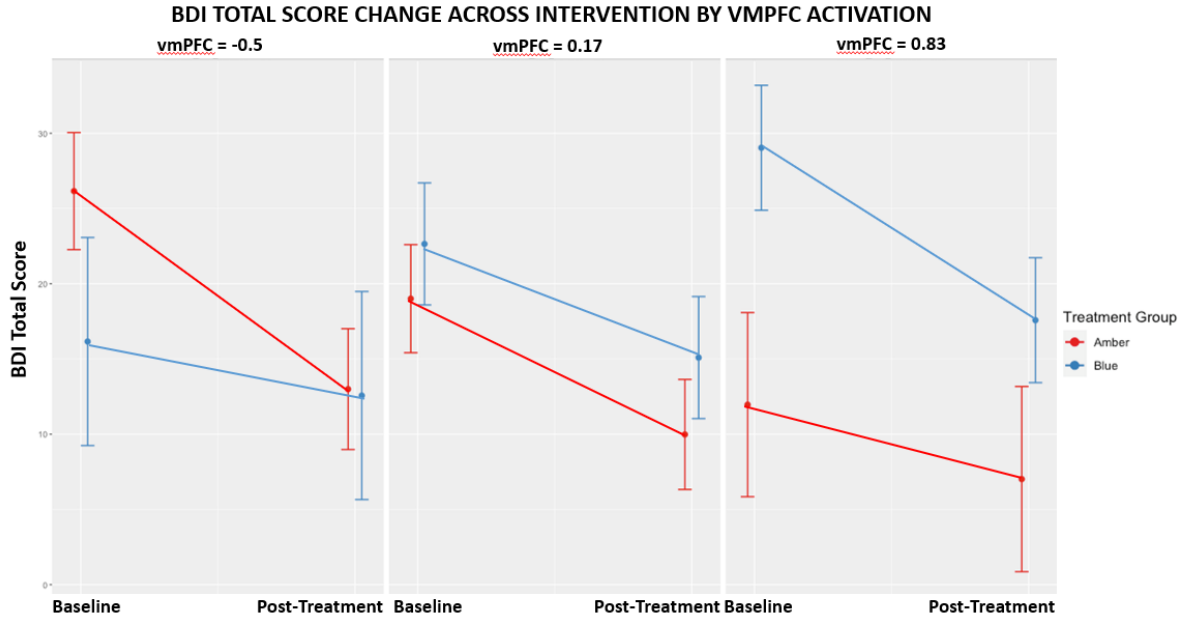


Figure 3.51. Improvements across time in depression symptoms as a function of light condition and brain activation during the fear recall fMRI scan in the vmPFC; plots are separated at the mean by one standard deviation for visualization purposes. Greater levels of vmPFC activation during the task predicted greater decreases in depression across study period for BLT.

For the fear extinction recall task, these findings did support the direct expectations from Hypothesis 3c. Specifically, we found the hypothesized increase in ventral-medial prefrontal activation following BLT versus ALT, relative to decrease in dorsolateral prefrontal and amygdala activation. We also demonstrated that decreased activation was observed across many of the anatomical regions associated with fear-based responses, including the hippocampus, insula, and dorsal anterior cingulate cortex. We also found that the activation within the vmPFC was related to depression symptomology changes, with greater activation associated with greater decreases in depression. This would be considered consistent with literature demonstrating vmPFC activity and REM sleep architecture dysfunction, similar to that observed in PTSD.

Overall, the findings from the fear extinction task support the global hypothesis that BLT improves brain function in a manner that aids in fear extinction/safety learning, even across longer durations of time that this type of paradigm is typically employed. Future work will need to identify the clinical significance of these outcomes as well as their temporal effect, but they are suggestive that BLT may be useful for improving safety learning outcomes.

Hypothesis 3e: Relative to ALT, six weeks of BLT will be associated with increased levels of GABA and reduced glutamate in the amygdala-hippocampal complex and anterior cingulate gyrus as measured by proton magnetic resonance spectroscopy (1H MRS).

The study protocol included three 1H MRS sequences, a voxel shim, the GABA edited sequence (68ms, 128 averages, produces ON and OFF spectra, 256 average per shot), and a single short echo time (30ms, 128 averages) for the basic 1D proton spectrum. Out of the 84 total cases, several had technical difficulties and scans were not obtained. Several scans were not taken due to an administrative hold that the local Institutional Review Board placed on the University neuroimaging facility that temporarily halted collection of MRS data for all labs. This hold had nothing to do specifically with our lab or procedures but did prevent several scheduled participants from receiving the MRS scans due to the administrative shut down of that procedure. Additionally, the final two participants did not receive 1H MRS scans due to restrictions enacted by the University during the COVID-19 pandemic. In total, 5 participants did not obtain any MRS (6% of the sample); an additional 5 participants are missing the baseline scan, and 12 are missing the post-treatment scan. This yielded 60 cases with complete pre- and post-treatment scans. All participants have T1 data sets (for voxel segmentation and tissue correction).

The 1H MRS data are currently being processed by our collaborators at McLean Hospital/Harvard Medical School. Due to the COVID-19 pandemic, our collaborators were delayed in processing these files, but we anticipate that the final dataset will be forthcoming in the next few months and expect to able to test Hypothesis 3e before the end of 2021.

Hypothesis 3f: Relative to ALT, six weeks of BLT will produce increased levels of N-acetyl-aspartate (NAA), choline (Cho), and reduced phosphocreatine (Cr) within the amygdala-hippocampal complex and anterior cingulate gyrus.

As described above, the 1H MRS data are currently being processed by our collaborators at McLean Hospital/Harvard Medical School. Due to the COVID-19 pandemic, our collaborators were delayed in processing these files, but we anticipate that the final dataset will be forthcoming in the next few months and expect to able to test Hypothesis 3f before the end of 2021.

Specific Aim 4: The fourth Aim is to demonstrate whether changes in subjective and objective measures of sleep are associated with changes in symptom severity, cognitive functioning, brain activation, and neurochemistry. Regardless of the success of the light therapy approach outcome in Aim 1, the available data was expected to provide some of the first longitudinal data examining changes in sleep patterns over time in individuals with PTSD and their correlation with these other metrics. Thus, useful data would be acquired even if the primary hypothesis of Aim 1 was not supported.

***Hypothesis 4a*: Changes in sleep parameters identified in Hypothesis 1 will correlate with improvements in memory, executive functioning, and neuropsychological performance on neurocognitive measures described in Hypothesis 2.**

Relationships between Sleep Improvements and Improvements to Self-Reported Symptoms. One of the key aims of the study was to demonstrate whether changes in sleep are associated with changes in symptom severity. We had hypothesized that improvements in objective and subjective sleep would be linearly correlated with improvements in symptom functioning.

Objective Sleep: Participants' sleep was monitored using wrist actigraphy during the one-week screening period and the six-week treatment period, providing us with long-term objective measures of sleep. These measures include duration (total sleep time), continuity (wake after sleep onset, sleep efficiency, and sleep onset latency), and timing (bedtime, waketime, and sleep midpoint). Changes in sleep were quantified using regression coefficients that characterized participants' unique slopes across the seven-weeks for which they wore the wrist actigraph devices. Changes in subjective sleep and mental health outcomes were quantified as the change between baseline scores and post-treatment scores. In all cases, high values indicate that the variable increased between baseline and post-treatment whereas low values indicate that a variable decreased between the two timepoints.

Results showed that changes in objectively measured sleep tended to be uncorrelated with changes in subjectively measured sleep, which is unsurprising as objective and subjective sleep are often found to be unrelated. However, there were significant relationships between actigraphy measured sleep and self-reported sleepiness. Participants who increased their total sleep time (r = -27, p = .021) and shifted their waketime later (r = -.28, p = .018) tended to have decreases in sleepiness between their baseline and post-treatment assessments. There was also some evidence of relationships between objective sleep changes and mental health. Increases to total sleep time was correlated with declines in depression, r = -.24, p = .020, and anxiety, r = -.23, p = .045, as well as increases in satisfaction in life, r = .27, p = .023. Moreover, increases in WASO (r = .23, p = .047), and decreases in SE, (r = -.26, p = .024), were associated with increases in depression, as measured by the patient health questionnaire.

Subjective Sleep. Participants also reported on their subjective perceptions of sleep using well validated measures such as the Pittsburg Sleep Quality Index (PSQI), Insomnia Severity Index (ISI) and Epworth Sleepiness Scale (ESS). Both changes in sleep outcomes and changes in mental health outcomes were quantified as the change between baseline scores and post-treatment scores. In both cases, high values indicate that the variable increased between baseline and post-treatment whereas low values indicate that a variable decreased between the two timepoints. In general, participants tended show improvements in their self-reported sleep between baseline and post-training, as shown in Table 5.

Table 5. *Changes in Subjective Sleep Between Baseline and Post-Treatment*

	Baseline	Post-Tx	Change
PSQI	9.53 (3.21)	7.89 (3.17)	-1.64
ISI			
Total	14.82 (5.68)	11.58 (5.97)	-3.24
Severe Clinical Insomnia	12.2%	6.1%	-6.1%
Moderate Clinical Insomnia	36.6%	25.6%	-11%
Subthreshold Insomnia	39%	45.1%	+6.1%
No Clinically Significant Insomnia	12.2%	23.2%	+11%
ESS			
Total	9.78 (4.28)	8.80 (3.95)	-.98
Excessively Sleepy	11%	4.9%	-6.1%
Possibly Excessively Sleepy	42.7%	35.7%	-7%
Average Daytime Sleepiness	13.4%	20.7%	+7.3%
Unlikely Abnormally Sleepy	31.7%	36.6%	+4.9%

Results showed much stronger relationships between changes in sleep and changes in mental health outcomes, with changes in sleep positively correlating with changes in depression, anxiety, and PTSD, and negatively correlating with changes to well-being. Table 6 reports the relationships between changes in sleep and self-reported symptoms, corrected for multiple comparisons. As PSQI scores decreased (indicating better quality sleep), PTSD and depression scores also decreased, whereas resilience scores tended to increase. As participants reported lower levels of insomnia, they also tended to report lower levels of PTSD and trait anxiety, and higher levels of resilience. Finally, as participants decreased in sleepiness, they tended to increase in satisfaction with life and sleep-related quality of life.

Table 6. *Relationships Between Subjective Sleep Changes and Changes in PTSD, Anxiety, and Depression Symptoms*

	PSQI-Total	ISI	ESS
PTSD			
CAPS – Symptoms	.26†	.29†	.21
CAPS-Severity	.32*	.29†	.14
PCL-5	.42*	.44*	.30†
Anxiety			
BAI	.05	.08	.18
STAI-S	.13	.22†	.18
STAI-T	.20	.45*	.32†
Depression			
BDI	.20	.30†	.22
PHQ	.37*		.22
Well-Being			
SWLS	-.17	-.26†	-.32*
CDRISC	-.37*	-.33*	-.18
FOSQ	-.22	-.28†	-.38*

Note: A Bonferroni correction was applied to adjust for multiple comparisons. *p <.004, †<.05
CAPS = Clinician Administered PTSD Scale; PCL = PTSD Checklist; BAI = Beck Anxiety inventory; STAI-S = State-Trait Anxiety Inventory-State; STAI-T = State-Trait Anxiety Inventory-Trait; BDI = Beck Depression Inventory; PHQ = Patient Health Questionnaire; SWLS = Satisfaction with Life Scale; CDRISC = Connor-Davidson Resilience Scale, FOSQ = Functional Outcomes of Sleep Scale.

Overall, we found support for our hypothesis that improvements in objective and subjective sleep would be linearly correlated with improvements in symptom functioning. This hypothesis was particularly supported when focusing on improvements to subjective sleep. Of course, it should be noted that these correlations do not indicate causal relationships between sleep and symptoms improvement. As sleep and clinical symptomology are tightly intertwined, it is possible that improvements to PTSD, anxiety, and depression symptoms may lead to improvements to sleep, or that there were bidirectional effects. However, regardless of the precise directional relationship involved, the present results highlight the importance of sleep in the continuation of psychopathology and/or improvements in symptoms.

Hypothesis 4b: Changes in sleep parameters identified in Hypothesis 1 will correlate with increased capacity for memory suppression and cognitive/emotional control during an fMRI memory suppression task and will be associated with an enhancement of the prefrontal cortex/hippocampus activation ratio.

As described earlier, the Memory Suppression Task was eliminated from the project due to the excessive burden and poor tolerability of the task by participants in the MRI scanner. Therefore, we have focused our analyses on the BMAT Fear task. This task is described in greater detail earlier in the report. Here, we focused on actigraphically measured total sleep time (TST) and its association with activation within the core emotional circuitry of the brain, including the ventromedial prefrontal cortex (vmPFC) and the amygdala. For these analyses, we examined the TST from the final week of treatment and the change in TST from pre- to post-treatment (TST Change). Each of these were correlated with the post-treatment BMAT scan in SPM12 using the multiple regression module.

Ventromedial Prefrontal Cortex Analysis: First we tested the primary hypothesis that post treatment TST would be positively correlated with cortical responses to the BMAT Fear condition (Fear > Neutral contrast) within the ventromedial prefrontal cortex (vmPFC). Findings were interrogated using a region-of-interest (ROI) set within the gyrus rectus of the vmPFC, with an uncorrected height threshold of $p < .005$, and cluster corrected at .05, FWE. As hypothesized, we found that individuals with greater total sleep time at post-treatment showed greater vmPFC responses to the masked fear faces ($p = .043$, cluster corrected). As shown in Figure 3.52, there was a significant positive correlation between TST at post-treatment and activation within the vmPFC ($p = .043$, FWE cluster corrected). The activation was most strongly correlated at MNI: $x = 4$, $y = 42$, $z = -18$. The activation at that location was extracted and plotted separately for the BLT and ALT groups. As evident in the figure, for the ALT group, there was a trend but it was not statistically significant ($r = .359$, $p = .066$), but was highly significant for the BLT group ($r = .60$, $p = .002$). Thus, the amount of variance accounted for was three times higher for the BLT group relative to the ALT group. Overall, this supports the general hypothesis that increased sleep leads contributes to greater capacity to regulate emotional responses. This appears to be facilitated by the use of BLT relative to ALT.

Additionally, we examined the correlation between the change in TST from baseline to post-treatment within the same region of the vmPFC. Overall, there was a cluster within the vmPFC that exceeded the uncorrected height threshold of $p < .005$ ($k = 11$; $x = 4$, $y = 42$, $z = -18$), but this region did not reach corrected significance. Nonetheless, we also examined this association for the BLT and ALT groups separately. For the placebo ALT group, this association did not reach statistical significance ($r = .359$, $p = .066$). However, for the BLT group, there was a significant positive correlation between the increase in TST over treatment and activation of the vmPFC at this location ($r = .508$, $p = .01$). This suggests that BLT appears to be facilitating the improvement of sleep and its association with greater activation of the vmPFC during perception of masked fearful faces.

Statistics: ***p-values adjusted for search volume***

cluster-level				peak-level					
$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}	mm mm mm
0.043	**0.034**	**51**	**0.034**	**0.169**	**0.418**	**3.55**	**3.34**	**0.000**	**4 42 -18**
				0.467	1.000	3.04	2.90	0.002	-8 42 -16

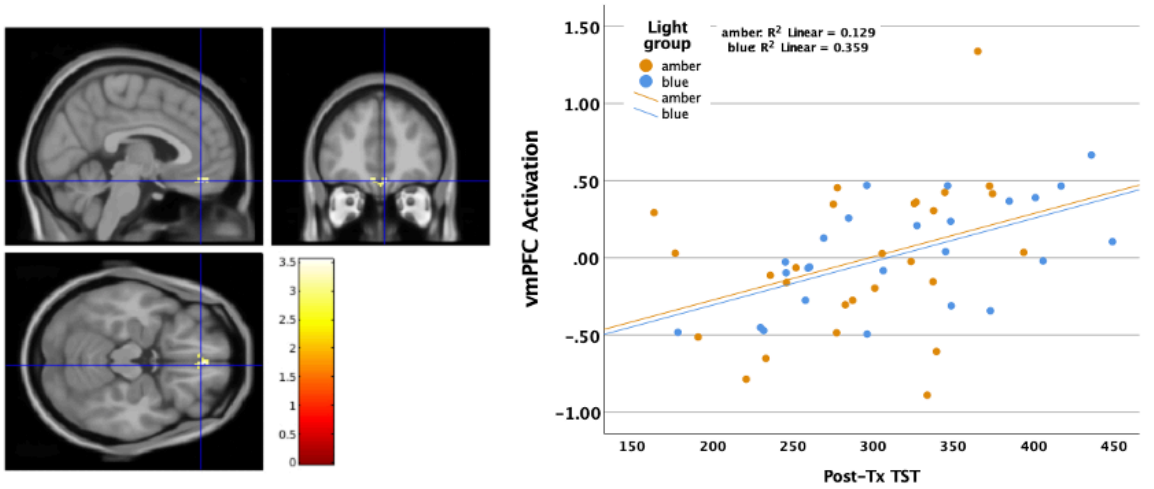


Figure 3.52. Total Sleep Time (TST) at the post-treatment period was associated with greater activation within the ventromedial prefrontal cortex (vmPFC) during the masked fear condition of the BMAT. The slope was nearly identical for the BLT and ALT groups, but the association within the BLT group accounted for nearly three times as much variance in activation patterns as in the ALT group. Findings suggest that total sleep time is important for activation in emotional regulatory regions and is particularly enhanced by BLT.

Amygdala Analysis: We also set an ROI within the bilateral amygdalae to examine the hypothesis that TST at post-treatment would be associated with differences in amygdala responses to the BMAT fearful faces (Fear > Neutral contrast). Findings were interrogated using a region-of-interest (ROI) set within the bilateral amygdalae, with an uncorrected height threshold of $p < .005$, and cluster corrected at .05, FWE. We found that individuals with greater total sleep time at post-treatment showed greater amygdala responses to the masked fear faces ($p = .01$, cluster corrected, see Figure 3.53). Further, we extracted these data from the amygdala and correlated them with TST separately for each light condition. As shown in the figure, TST was positively associated with greater right amygdala responses for both the BLT and ALT groups. For the ALT group, the correlation between TST and amygdala response was statistically significant ($r = .50$, $p = .008$), while the BLT association was even stronger ($r = .638$, $p = .0006$).

We also examined the correlation between the change in TST from baseline to post-treatment within the amygdala. However, we did not find any significant associations between change in TST over treatment and changes in amygdala responses. Thus, the present finginds suggest that treatment has a greater effect on prefrontal functioning, and perhaps its capacity to regulate emotional responses than it does directly upon activation of the amygdala.

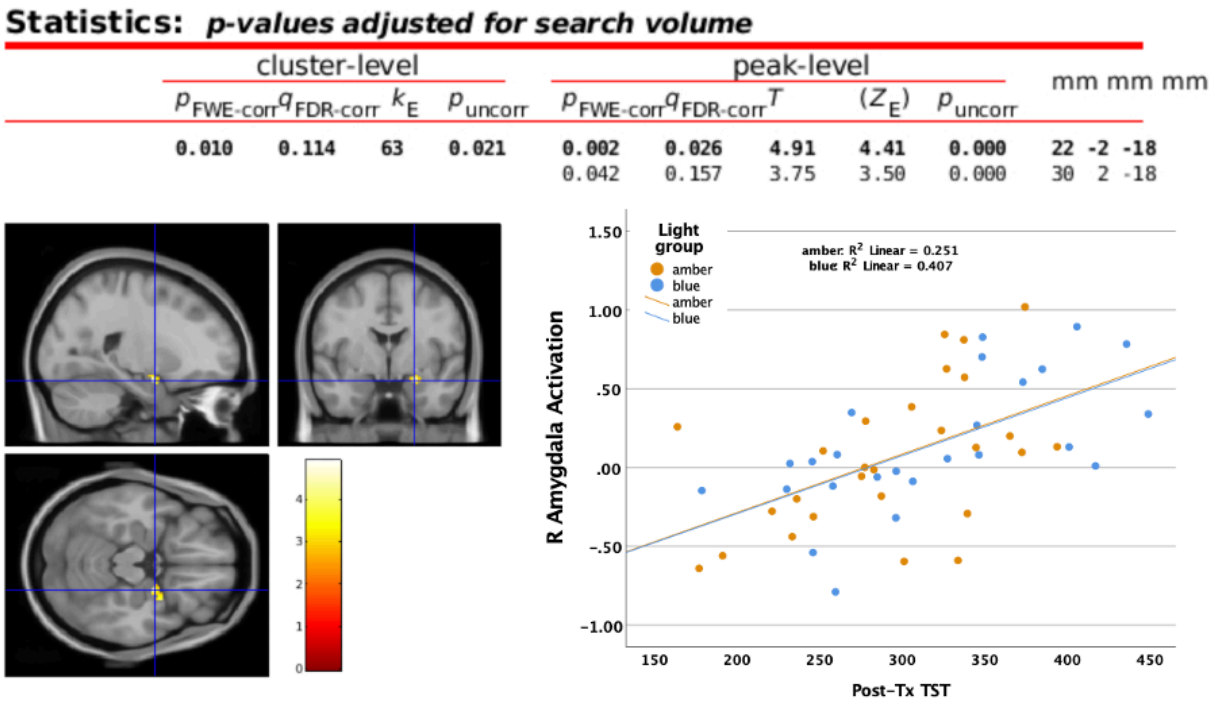


Figure 3.53. Total Sleep Time (TST) at the post-treatment period was associated with greater activation within the right amygdala during the masked fear condition of the BMAT. The slope was nearly identical for the BLT and ALT groups, but the association within the BLT group accounted for slightly more variance in activation patterns as in the ALT group.

Whole Brain Exploratory Analysis: We also wanted to explore additional associations that might be relevant to PTSD. Therefore, we set a liberal threshold of $p < .005$, k = 50, across the whole brain, predicting that greater TST at post treatment would correlate with greater activation in the aforementioned regions. As shown in Figure 3.54, we found a positive correlation within the same two regions described above (vmPFC and amygdala), but also found a significant positive correlation with the right fusiform face area as well. This is a region that is well known to activate to faces, and we see here that this region is more activated among individuals who obtain more total sleep time. However, this is highly modulated by light condition. For the ALT placebo group, the association between TST and fusiform face area responses did not reach statistical significance (r = .31, p = .12), but was highly significant for the BLT group (p = .80, p = .000002).

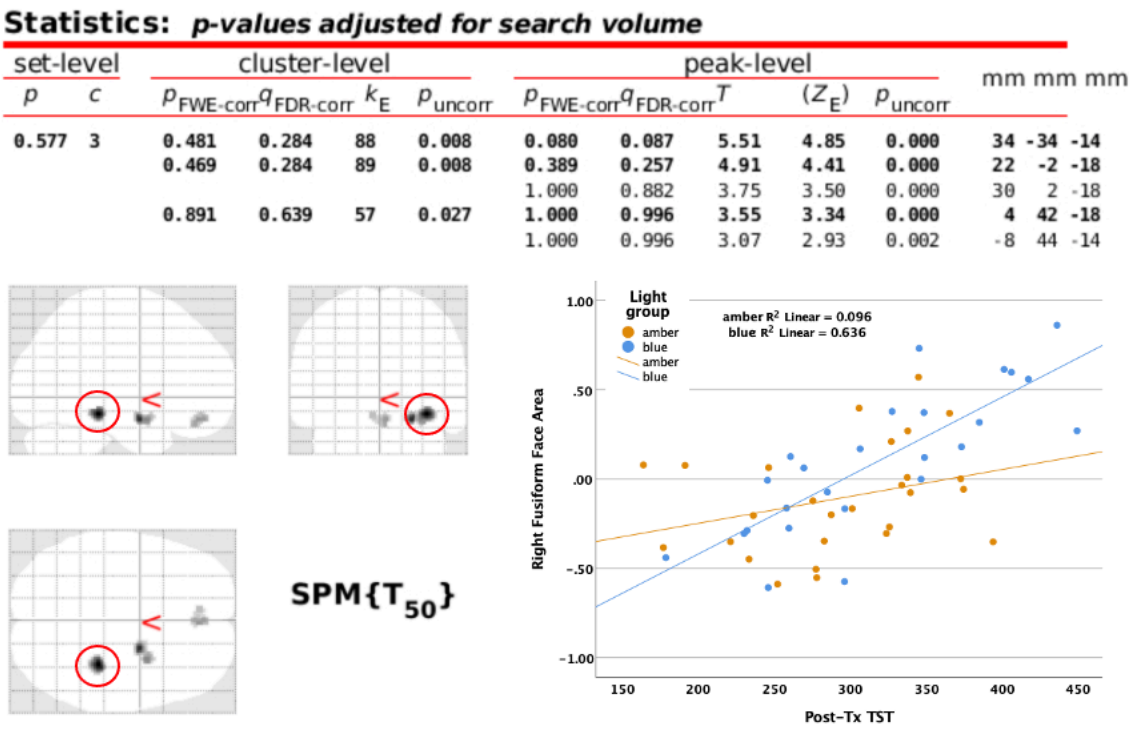


Figure 3.54. Total Sleep Time (TST) at the post-treatment period was associated with greater activation within the right fusiform face area during the masked fear condition of the BMAT. The association was not significant for the amber (ALT) group but was highly significant for the BLT group.

***Hypothesis 4c*: Changes in sleep parameters identified in Hypothesis 1 will correlate with changes in neurochemistry as outlined in Hypothesis 3e and 3f above.**

As described above, the 1H MRS data are currently being processed by our collaborators at McLean Hospital/Harvard Medical School. Due to the COVID-19 pandemic, our collaborators were delayed in processing these files, but we anticipate that the final dataset will be forthcoming in the next few months and expect to able to test Hypothesis 4c before the end of 2021.

CAVEATS AND CONSIDERATIONS

One of the most notable findings in this project was that participants in both the BLT and placebo ALT groups showed significant improvements on a variety of outcome measures. These participants had been experiencing PTSD symptoms for several years, on average, yet both groups found the treatments to be beneficial. Participants in the BL treatment did show improvements to the PTSD, anxiety, depression, and well-being scores. However, participants in the PL treatment did as well. The finding that participants in the study tended to demonstrate improvements over time regardless of whether they were assigned to the BL or PL conditions raises important questions about why this may have been the case, including possible placebo effects, light effects, and the effects of time.

Placebo effects. One possibility is that participants in both groups improved due to expectations (i.e., placebo effects). Upon the conclusion of the study, participants were asked whether they thought they had been assigned to the active or placebo treatment, and to indicate their confidence in their guess. The majority of participants believed that they had been assigned to the active condition, regardless of which group they were assigned, despite the fact that they were randomly assigned. Interestingly the expectations were equally distributed between actual treatment assignment (see Table 7). The participants assigned to the BL and PL were also similarly confident in their guess, $t(78) = .56$, $p = .576$, $d = .13$, with both BL ($M = 3.63$, $SD = 1.05$) and PL ($M = 3.48$, $SD = 1.38$) groups being between 50-75% confident in their guess (scale: 1 = 0% confident; 5 = 100% confident). This suggests that participants did not have insight as to whether they were receiving the active or placebo treatment. To examine whether placebo effects may have explained similar improvements across groups, we reran the analysis using perceived treatment condition, rather than actual group condition predicting changes in mental health symptoms. The results did not show evidence of a placebo effect. Results continued to show strong effects of time, but there was no evidence for group x time interactions, *p*s = .145-.989.

Table 7. *Distribution of Perceived and Actual Treatment Assignments*

		Actual Assignment	
		Active	Placebo
Participant Belief	Active	31	29
	Placebo	11	9

Light effects. One possible explanation for the similar improvements is that our ALT placebo treatment actually had active effects on some aspects of emotion or brain functioning. Amber light has previously been used as a placebo therapy. However, there have been few, if any, reliable tests of the effects of amber light against an alternative sham/placebo condition, so it may have unknown effects that could significantly impact sleep or other aspects of recovery. Future research should consider adding an inactive no light condition to fully separate the effects of different light exposures on sleep and improvements to mental health.

Incidental effects of treatment. Another possible explanation for the consistent improvements across both groups on multiple emotional outcome and symptoms measures is that the light treatment may have led to better sleep and mental health for reasons other than the primary hypothesized active ingredient (i.e., blue light). For example, the behavioral component of regularly using the light box each morning at the same time may have aided in the development of a routine, which could provide a sense of control and purpose, as well as establishing a more consistent daily rhythm. Prior research has suggested that regular routines can positively influence sleep and health. Similarly, filling out sleep diaries every day may have helped the person become more aware of their sleep, mood, and day-to-day factors that influence sleep. Future research may want to further investigate these possibilities.

CONCLUSIONS

PTSD is a severe disorder that involves exaggerated fearful emotional responses that persist following a traumatic event. Sleep disruption is one of the most common findings among individuals diagnosed with PTSD. Because of the intimate relationship between PTSD symptoms and sleep problems, we hypothesized that improvement of sleep may facilitate recovery from the disorder. Based on accumulating evidence that the circadian system and sleep-wake patterns are quite powerfully affected by exposure to light, we proposed to use light therapy to regulate the sleep wake schedule of individuals with PTSD, thereby potentially enhancing recovery. Further, because blue-wavelengths have been shown to activate specific intrinsically photosensitive retinal ganglion cells (ipRGCs), that play a key role in regulating the circadian pacemaker in the suprachiasmatic nucleus of the hypothalamus, we hypothesized that blue light therapy (BLT) would be more effective than a similar amber wavelength light therapy

(ALT). We compared 6-weeks of BLT versus ALT on a variety of sleep, symptom, cognitive, and brain outcome measures in individuals meeting criteria for PTSD.

Overall, we find that BLT was more effective than ALT at improving total sleep time. These improvements in the amount of sleep were associated with reductions in PTSD symptoms on the CAPS. Additionally, the BLT condition was associated with greater retention of extinction memories following a fear conditioning and extinction protocol. Moreover, the BLT condition was associated with an increase in ventral-medial prefrontal activation and a decrease in dorsolateral prefrontal and amygdala activation in response to previously feared and then extinguished stimuli. We also demonstrated that decreased activation was observed across many of the anatomical regions associated with fear-based responses, including the hippocampus, insula, and dorsal anterior cingulate cortex for BLT versus ALT. We also found that the activation within the vmPFC was related to depression symptomology changes, with greater activation associated with greater decreases in depression. Task based fMRI also supported the role of BLT and greater total sleep time in facilitating increased prefrontal activation, which has consistently been associated with greater recovery from PTSD. These preliminary findings add to a growing body of research that suggest that light therapy may be useful for facilitating recovery from PTSD. At present, we are not advocating the use of BLT as a sole treatment approach, but the evidence suggest that it may serve effectively as an adjunctive treatment to maximize gains made from other ongoing therapeutic approaches.

Importantly, the effects of BLT were not different from placebo ALT for a number of outcomes as well. In fact, many outcomes appear to have improved over time regardless of the light condition. Thus, BLT appears to be effective for some aspects of PTSD recovery, particularly those involving improvement of total sleep time, prefrontal cortex regulation of emotion, and retention of extinction memories, but does not lead to a comprehensive improvement in functioning across all outcomes relative to the ALT. Some evidence suggests that the daily routine and expectations imposed by the light treatment condition, regardless of wavelength, may also provide significant benefit. Given the positive effects observed here, these factors deserve additional research.

The present findings also suggest that there is considerable heterogeneity of responses to BLT. Some individuals show a very strong response to BLT, while others seem to be relatively weakly affected. Further research to clarify the mechanisms of these individual differences, such as genetic and other psychophysiological variables, will be important to facilitate further development of light therapies for PTSD and other disorders. This initial work provides a solid foundation for further research into the potential utility of BLT and other light therapy approaches for augmenting recovery from PTSD.

3.G Supplementary Analyses

Due to the large scope and nature of the project, we were able to collect extensive amounts of behavioral and neuroimaging data. Therefore, in addition to the primary hypotheses of the proposal, we have had the opportunity to conduct extensive supplementary and exploratory analyses. These supplemental analyses will be presented in several sections, including 1) exploratory analysis of diffusion tensor imaging data (section 3.F.I), 2) an extensive analysis of voxel-based morphometry (VBM) data (section 3.F.II), and 2) a general chronological summary of preliminary findings that emerged over the multiple years of the study, many of which were presented at conferences or in preliminary publications (section 3.F.III).

3.G.I Diffusion Tensor Imaging (Tract-Based Spatial Statistics—TBSS)

Neuroimaging data was used to conduct analyses on diffusion metrics, which quantify fiber characteristics and provide measures of axonal integrity. As outlined in the methods section, standard processing pipelines were used to calculate FA, MD, RD, and AD in TBSS using a whole brain approach. Difference scores were calculated for the diffusion metrics, such that positive values indicated a gain from pre- to post-treatment. Although diffusion analyses were not proposed in the primary aims of the grant, exploratory analyses were conducted from data collection throughout the duration of the study. From these data, it was hypothesized that changes in diffusion metrics (FA, MD, RD, and AD) would be significantly greater in the BLT, compared to PLT condition.

Sample Characteristics. Due to excessive artifacts identified during the quality control checks conducted following QSI Prep, the following analyses were conducted on a sample size of N = 68. The sample include equal number of participants who received blue light treatment (BLT: n = 34) and placebo/amber light treatment (PLT: n = 34). The ratio of females to males was similar across the two conditions, with 23 females and 11 males (age M = 31.53, SD = 9.09) in the BLT condition, and 24 females and 10 males (age M = 30.32, SD = 8.64) in the PLT condition.

Group Differences. Voxel-wise statistics were calculated to compare white matter integrity between BLT and PLT. General linear models (GLMs) were fit with group as the categorical independent variable (BLT, PLT) and DTI metric as (FA, MD, RD, AD) as the dependent variable, controlling for participant age and sex. Using a whole-brain analytic approach, changes in FA were significantly greater in the BLT, compared to PLT group (see Table S1). Results were corrected for multiple comparisons at $p < .05$, 1-tailed, FEW corrected, based on threshold-free cluster-enhanced (TFCE) statistic image using default parameters (H=2, E=0.5; 500 permutations). With regard to FA, there were no voxel that showed significantly greater change in the PLT, compared to BLT condition. Furthermore, changes in MD, RD, and AD from baseline to post-treatment did not differ significantly between BLT and PLT groups. Table 1 lists the 6 clusters that differed significantly between BLT and PLT, in descending order based on number of voxels.

Table S1. Significant FA Clusters BLT > PLT

Cluster	Voxels	X	Y	Z	Label
6	5424	-8	-33	15	Corpus callosum
5	689	24	-23	9	R Corticospinal tract
4	51	40	-23	-4	R Inferior longitudinal fasciculus
3	15	47	-20	-2	R Inferior longitudinal fasciculus
2	4	29	-32	49	R Superior longitudinal fasciculus
1	3	28	-32	43	R Superior longitudinal fasciculus

Note: X, Y Z, coordinates are provided in MNI space.

Neuropsychological Associations. Clusters were extracted and used in subsequent analyses to test whether significant changes between the groups in FA from baseline to post-treatment were associated with changes in neuropsychological measures. Pearson correlations were calculated between change scores on neuropsychological measures and FA in the six previously identified clusters. Covariates in the correlations included participant age and sex.

Cluster 6: The largest cluster (voxel size = 5424) showing significant differences between BLT and PLT was primarily left lateralized, and included voxels in the corpus callosum, cingulum left corticospinal tract, and left superior longitudinal fasciculus (see Figure S1). Participants who received BLT, compared to PLT, exhibited significantly greater increases in FA (p = .03, 1-tailed, FEW corrected). With regard to neuropsychological data, changes in FA were significantly associated with changes in gratitude, as measured by the six-item Gratitude Questionnaire (GQ-6). We found that greater changes in FA, from baseline to post-treatment, were associated with significantly greater changes in gratitude (r = .346, p = .006) (see Figure S1).

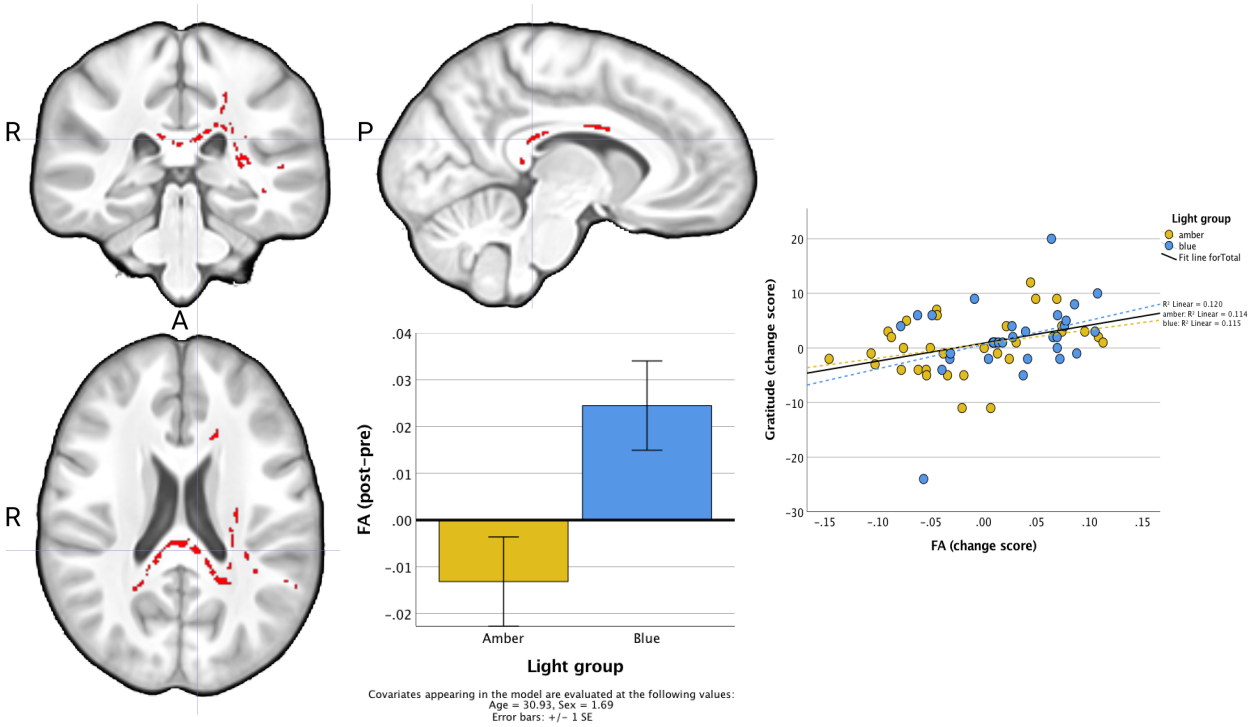


Figure S1. Red voxels in **Cluster 6** denote regions of white matter where changes in FA were significantly greater in the blue light treatment (BLT) compared to amber/placebo light treatment (PLT) condition (BLT > PLT). Bar chart shows change in FA from baseline to post-treatment for Blue and Amber group. Scatter plot shows significant association between changes in FA and changes in gratitude, as measured by GQ-6.

Cluster 5: The second largest cluster (voxel size = 689) showing significant differences between BLT and PLT was right lateralized, and included voxels in the right corticospinal tract, (see Figure S2). Participants who received BLT, compared to PLT, exhibited significantly greater increases in FA (p = .03, 1-tailed, FEW corrected). With regard to neuropsychological data, changes in FA were significantly associated with changes in gratitude, as measured by the six-item Gratitude Questionnaire (GQ-6). We found that greater changes in FA, from baseline to post-treatment, were associated with significantly greater changes in gratitude (r = .335, p = .007) (see FigureS2).

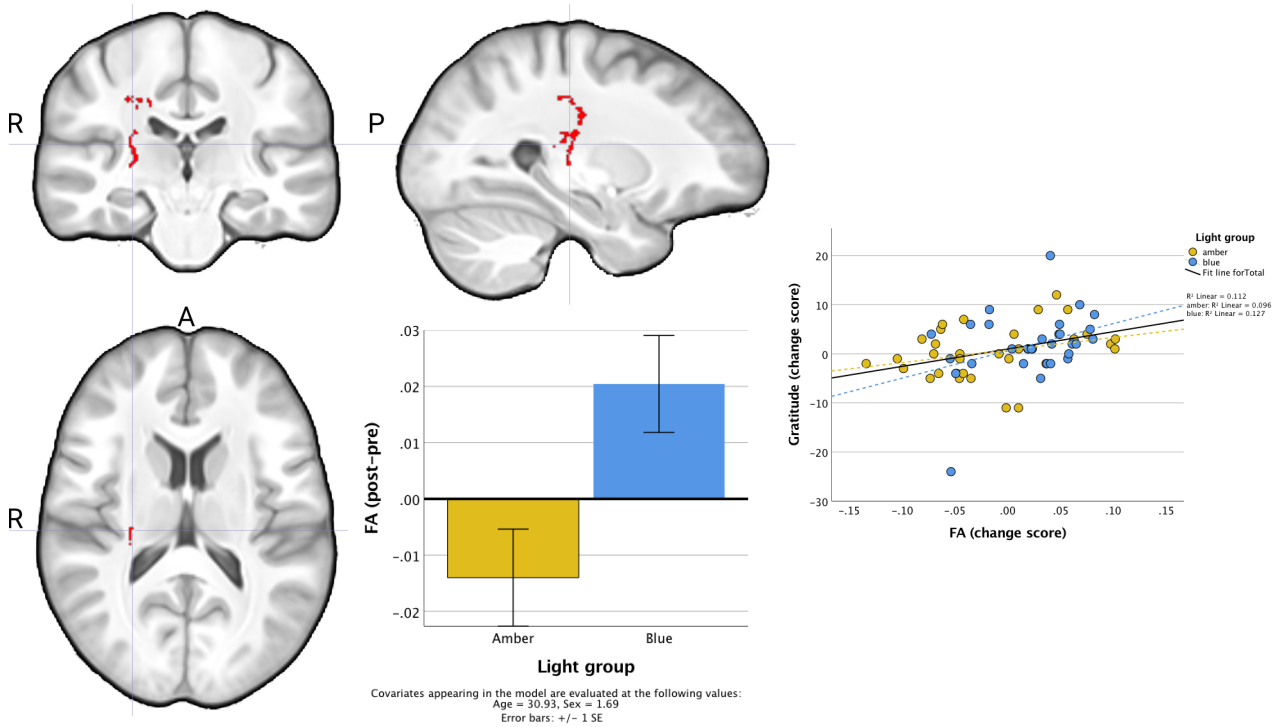


Figure S2. Red voxels in **Cluster 5** denote regions of white matter where changes in FA were significantly greater in the blue light treatment (BLT) compared to amber/placebo light treatment (PLT) condition (BLT > PLT). Bar chart shows change in FA from baseline to post-treatment for Blue and Amber group. Scatter plot shows significant association between changes in FA and changes in gratitude, as measured by GQ-6.

Cluster 4: Cluster 4, (voxel size = 51) showed significant differences between BLT and PLT in the right inferior longitudinal fasciculus, (see Figure S3). Participants who received BLT, compared to PLT, exhibited significantly greater increases in FA (p = .03, 1-tailed, FEW corrected). Similar to clusters 5 and 6, changes in FA were significantly associated with changes in gratitude, as measured by the six-item Gratitude Questionnaire (GQ-6). We found that greater changes in FA, from baseline to post-treatment, were associated with significantly greater changes in gratitude (r = .328, p = .009) (see Figure S3).

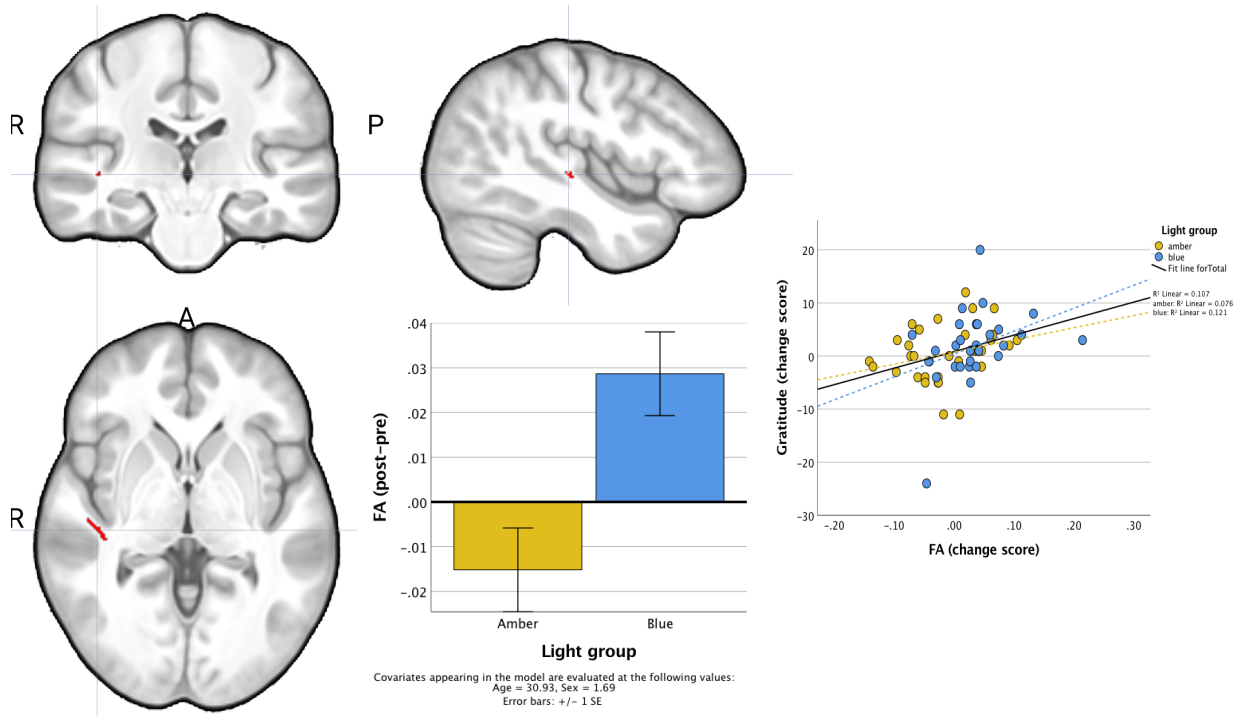


Figure S3. Red voxels in **Cluster 4** denote regions of white matter where changes in FA were significantly greater in the blue light treatment (BLT) compared to amber/placebo light treatment (PLT) condition (BLT > PLT). Bar chart shows change in FA from baseline to post-treatment for Blue and Amber group. Scatter plot shows significant association between changes in FA and changes in gratitude, as measured by GQ-6.

Cluster 3: Cluster 3, (voxel size = 15) showed significant differences between BLT and PLT in the right inferior longitudinal fasciculus, (see Figure S4). Participants who received BLT, compared to PLT, exhibited significantly greater increases in FA (p = .03, 1-tailed, FEW corrected). Similar to clusters 5 and 6, changes in FA were significantly associated with changes in gratitude, as measured by the six-item Gratitude Questionnaire (GQ-6). We found that greater changes in FA, from baseline to post-treatment, were associated with significantly greater changes in gratitude (r = .299, p = .017) (see Figure S4).

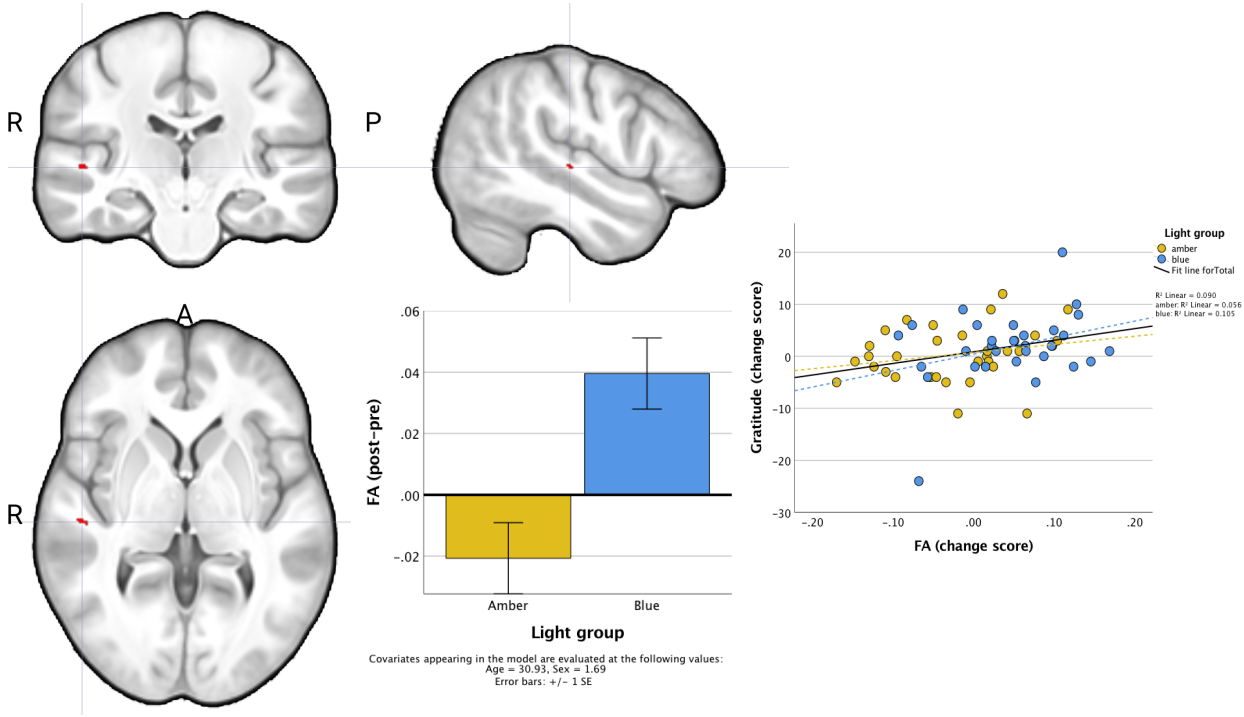


Figure S4. Red voxels in **Cluster 3** denote regions of white matter where changes in FA were significantly greater in the blue light treatment (BLT) compared to amber/placebo light treatment (PLT) condition (BLT > PLT). Bar chart shows change in FA from baseline to post-treatment for Blue and Amber group. Scatter plot shows significant association between changes in FA and changes in gratitude, as measured by GQ-6.

Clusters 2 and 1: The final two clusters were relatively small in size (cluster 2: voxel size = 4; cluster 1: voxel size = 3) and showed significant differences between BLT and PLT in the right superior longitudinal fasciculus, (see Figure S5). Participants who received BLT, compared to PLT, exhibited significantly greater increases in FA (p = .03, 1-tailed, FEW corrected). There were no significant associations with neuropsychological outcome measures.

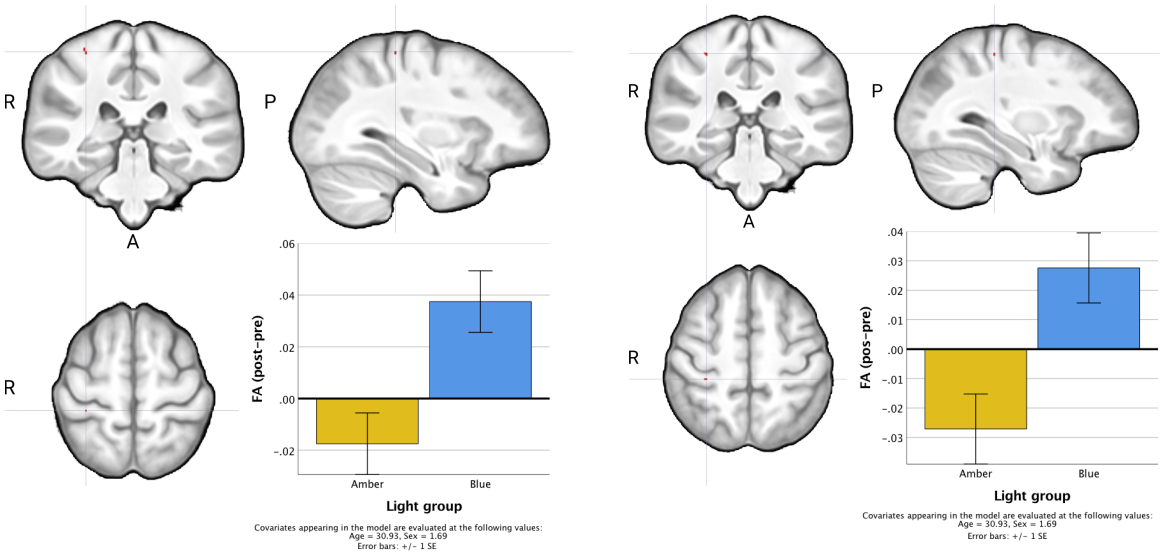


Figure S5. Left: Red voxels in **Cluster 2** denote regions of white matter where changes in FA were significantly greater in the blue light treatment (BLT) compared to amber/placebo light treatment (PLT) condition. Bar chart shows change in FA from baseline to post-treatment for Blue and Amber group. Right: Red voxels in **Cluster 1** denote regions of white matter where changes in FA were significantly greater in the blue light treatment (BLT) compared to amber/placebo light treatment (PLT) condition. Bar chart shows change in FA from baseline to post-treatment for Blue and Amber group.

While exploratory in nature, these findings suggest that for patients with PTSD, blue light therapy, compared to an amber placebo light, appears to facilitate an increase in fractional anisotropy, which is associated with positive changes in one's proneness to experience gratitude in daily life.

3.G.II Gray Matter Volume (Voxel-Based Morphometry—VBM)

Although gray matter volume was not listed as a primary outcome variable in the original grant application, we have collected T1-weighted anatomical images on all of our participants, so it was possible to also compare groups on gray matter volume (GMV) using a technique known as Voxel Based Morphometry (VBM). We present these data as supplementary analyses that may help inform ongoing work on PTSD and clarify the current associations between brain structure and function.

Structural Neuroimaging Methods. Volumetric data were collected using a T1 weighted 3D magnetization-prepared rapid acquisition gradient echo (MPRAGE) sequence (TR/TE/flip angle = 2.1 s, 2.3 ms, 12°) that consisted of 176 sagittal slices (256x256 matrix) with a slice thickness of 1 mm and a voxel size of 1 x 1 x 1 mm^3. T1 weighted structural images were preprocessed using the Computational Anatomy Toolbox (CAT12) (http://www.neuro.uni-jena.de/cat/) in SPM12 (http://www.fil.ion.ucl.ac.uk/spm/software/spm12/). Images were realigned to the anterior-posterior commissure axis and then segmented using the longitudinal pipeline into gray matter, white matter, and cerebrospinal fluid using VBM12, a fully automated algorithm in SPM12. Segmented images were used to create a custom DARTEL template and then the images were normalized to Montreal Neurological Institute (MNI) space. Smoothing of normalized images was performed with a 10mm full width at half maximum (FWHM) isotropic Gaussian kernel. Data were analyzed using the general linear model (GLM) based on the standard contrasts available in SPM12, including simple and multiple regression, t-tests, and 2 (light condition) x 2 (pre- versus post-treatment) mixed analysis of variance (ANOVA) using the Flexible Factorial Model in SPM12. Global normalization was applied to all analyses. Covariates were included in the model, including age, sex, and total intracranial volume (TIV). Unless otherwise specified, findings were thresholded at $p < .001$ for height, with cluster correction thresholds applied as specified in specific sections. The random design matrix is shown in Figure S6.

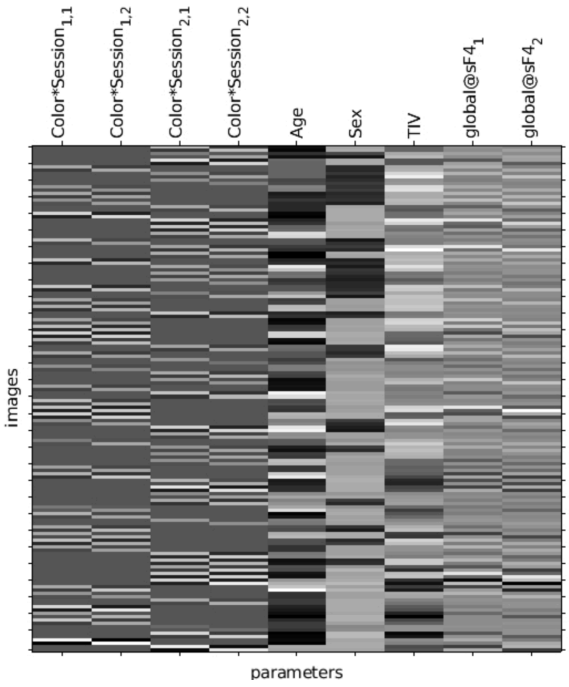


Figure S6. Voxel based morphometry (VBM) was analyzed using the Flexible Factorial Model in SPM12. The design matrix shows the primary conditions for the Light Condition x Session interactions, and covariates. This was used to conduct the omnibus F-test of the 2 (Blue vs. Amber) x 2 (Pre-Tx vs Post-Tx) analysis of variance (ANOVA).

Analysis Plan

Analyses proceeded in multiple stages. First, we tested specific hypotheses related to expected changes in GMV associated with light condition that would be relevant to common emotional symptoms of PTSD. Second, we conducted broader exploratory analyses to provide additional information that could be useful for future research into the effects of light exposure on GMV. Third, we provide cortical surface maps showing regions of GMV changes and correlations with relevant variables.

Focused Hypotheses

First, we hypothesized that six weeks of daily exposure to BLT light vs. placebo ALT would yield a similar pattern of findings to what was demonstrated in our prior published work on mild traumatic brain injury (mTBI) (Killgore et al., 2020). In that project, we found that BLT was associated with increased volume of the posterior thalamus by the end of treatment, but this was not observed for ALT. Second, because re-entrainment of the circadian rhythm is expected to improve mood and facilitate emotional recovery, we also proposed that the BLT condition would be associated with significant changes in core emotion processing regions associated with PTSD, including the amygdala, insular cortex, medial prefrontal cortex (mPFC), and dorsal anterior cingulate cortex (dACC).

Replication of Posterior Thalamus Volume. In a prior study of 32 adults with mTBI, we found that six weeks of BLT, using the same parameters used here, resulted in a significant increase in posterior thalamic volume (Killgore et al., 2020). This was most notable in the left thalamus, but was also found in the right thalamus (see Figure S7). In a follow-on study that combined an additional 30 mTBI participants, we found that BLT was still associated with increased thalamic volume (Raikes et al., 2021). Therefore, we sought to determine whether this finding could be extended to the present sample of individuals with PTSD.

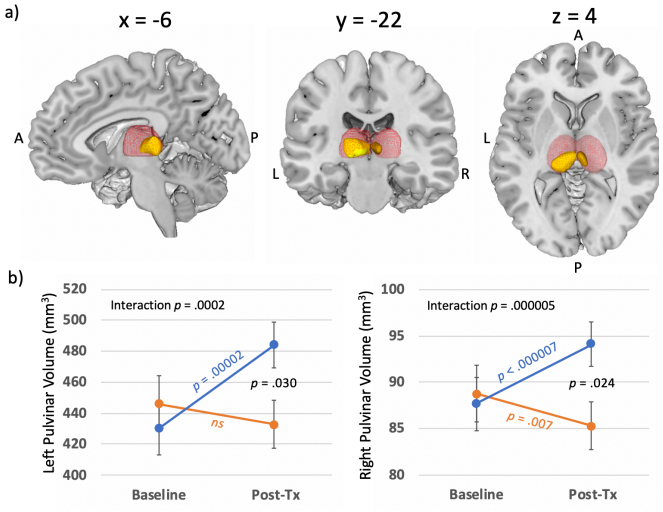


Figure S7. Previously published results of a whole brain voxel-based morphometry (VBM) analysis of individuals with mild traumatic brain injury (mTBI) comparing baseline and post-treatment changes for those receiving the blue light condition (Killgore et al., 2020). (**a**) The figure shows the sagittal (left) coronal (middle) and axial (right) orientations. This analysis showed significant increases in gray matter volume (GMV) within the left (567 voxels; MNI: x = -3, y = -22, z = 3) and right (119 voxels; MNI: x = 3, y = -22, z = 3) posterior thalamic volume for those receiving the BLUE light intervention ($p_{FWE} < .05$). (**b**) Extracted volumes from each of these clusters are plotted in the figures for visualization for the left and the right thalamic regions for the BLUE and AMBER groups separately. The locations of the left and right thalami are represented by the red wire mesh areas of the figure. It is clear that BLUE light was associated with significant increases in the volume of both the left and right posterior regions, but this was not evident for the same regions in the AMBER group.

Following the same procedures outlined in our previously published paper (Killgore et al., 2020), we directly compared the GMV at post-treatment to the GMV at baseline within the left thalamus at $p < .005$ (uncorrected), k = 43. The global maximum was located at: MNI x = -20, y = -30, z = 3. As shown in Figure S8, this region is extremely similar to the one identified in the left hemisphere for the mTBI sample described above. However, as shown in Figure S8, similar increases in left thalamic volume were also apparent within the ALT group as well, resulting in a non-significant interaction, F(1,71) = 1.51, p = .223. Thus, while BLT showed evidence of increased left thalamic volume following treatment, similar to our previous results in mTBI, it also appears that similar changes were evident for ALT in the PTSD sample. *These findings suggest that blue light therapy appears to have similar effects on the volume of the left thalamus as that seen in prior work, but that individuals with PTSD seem to respond similarly to the ALT placebo as well.*

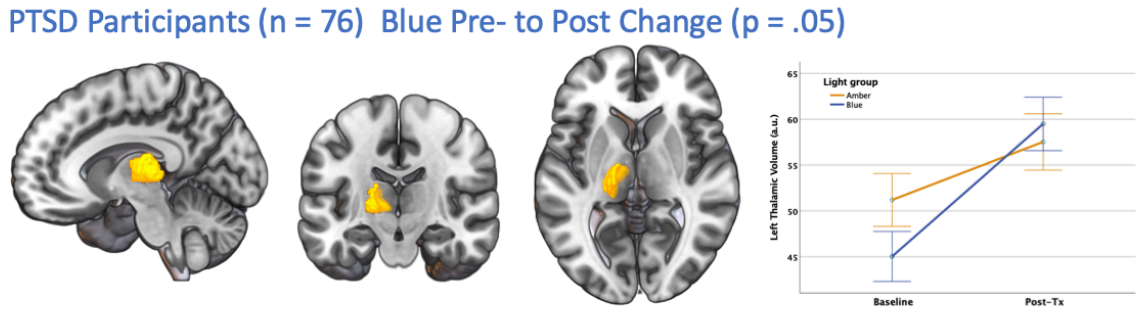
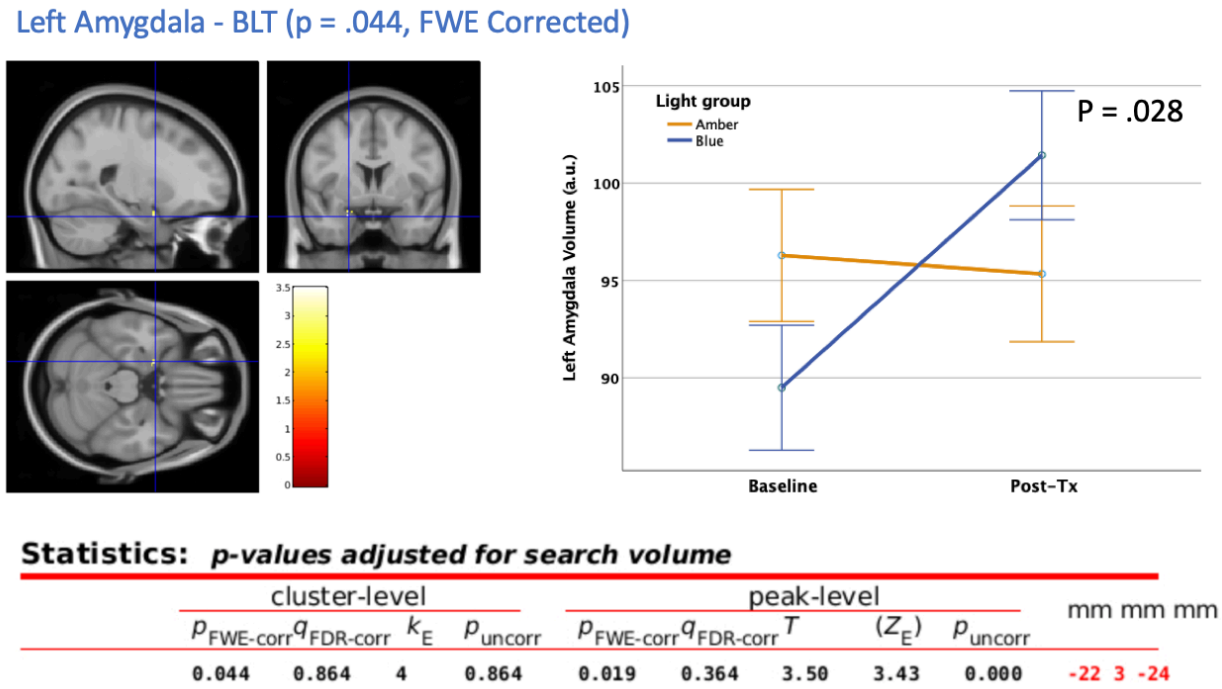


Figure S8. Similar to our prior published work in mTBI, BLT was associated with increased volume of the left thalamus following six weeks of treatment. This cluster was located at MNI coordinates of x = -18, y = -28, z = 2. However, as shown in the rightmost figure, ALT showed a similar increase in left thalamic volume, a finding that differs from prior work in mTBI.

Amygdala Volume. Prior studies have demonstrated smaller amygdala volumes among individuals with PTSD relative to healthy individuals and trauma exposed healthy individuals without PTSD, particularly on the left (Morey et al., 2012; Morey et al., 2016; Ousdal et al., 2020; Starcevic et al., 2014). Therefore, we examined whether BLT would lead to changes in amygdala GMV from pre- to post-treatment. Bilateral regions of interest, defined by the Automated Anatomical Labeling (AAL) Atlas implemented in the PickAtlas utility, were placed on the location of the left and right amygdala. These small regions were interrogated for the BLT contrast (Post > Baseline) at a height threshold of $p < .001$ (uncorrected), yielding a small volume cluster corrected region of difference in the left amygdala at p = .044 (FWE cluster corrected). The modulated GMV within this cluster was extracted for both groups. As evident in the right side of Figure S9, there was a significant light condition x session interaction within this region of the left amygdala, F(1,74) = 5.35, p = .023, suggesting that BLT was associated with a significant increase in GMV while no difference was evident for the placebo ALT group. *These findings suggest that blue light therapy appears to facilitate a volumetric increase in left amygdala volume.*



Statistics: ***p-values adjusted for search volume***

cluster-level				peak-level					mm mm mm
$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}	
0.044	0.864	4	0.864	0.019	0.364	3.50	3.43	0.000	-22 3 -24

Figure S9. The left panel shows the region of the left amygdala (k = 4) that showed significant increase in GMV from baseline to post-treatment for the BLT group (p = .044, FWE small volume cluster corrected). SPM12 statistics are shown in the bottom panel. The right panel shows the significant (p = .028) interaction between light condition and testing session.

Temporal Pole Volume. The temporal pole plays an important role in emotional processing and socially relevant memory (Nakamura et al., 2001). Recent work has suggested that GMV within the right temporal pole is often decreased among patients with PTSD relative to healthy individuals or those with other psychiatric issues (Gosnell et al., 2020; Zhang et al., 2018). An increase in volume of this region could be expected to be associated with greater capacity for emotional processing and a reduction in symptoms of PTSD. Therefore, we examined whether BLT would be associated with a normalization of right temporal pole volume. We placed a search region in the right middle/inferior temporal pole region, using the AAL implemented in the PickAtlas utility. This small region was interrogated for the BLT contrast (Post > Baseline) at a height threshold of $p < .001$ (uncorrected), yielding a small volume cluster corrected region of difference in the right temporal pole at $p = .057$, k = 77 (FWE cluster corrected). Volume data were extracted from this region and entered into a 2 (light condition) x 2 (session) mixed ANOVA. As evident in Figure S10a, while the increase in right temporal pole GMV was marginally

significant for the BLT group, this was not significant for the placebo ALT group. Nevertheless, this did not yield a significant light condition x session interaction, F(1,71) = 1.49, p = .23. We also conducted a parallel analysis on the left temporal pole implementing the same procedures as above. As shown in Figure S10b, this was significant for the BLT group (p = .05), but the interaction between light condition x testing session was not significant (p = .31). *These findings suggest that blue light therapy may lead to increased volume of the right temporal pole, but that further research is warranted before firm conclusions can be drawn.*

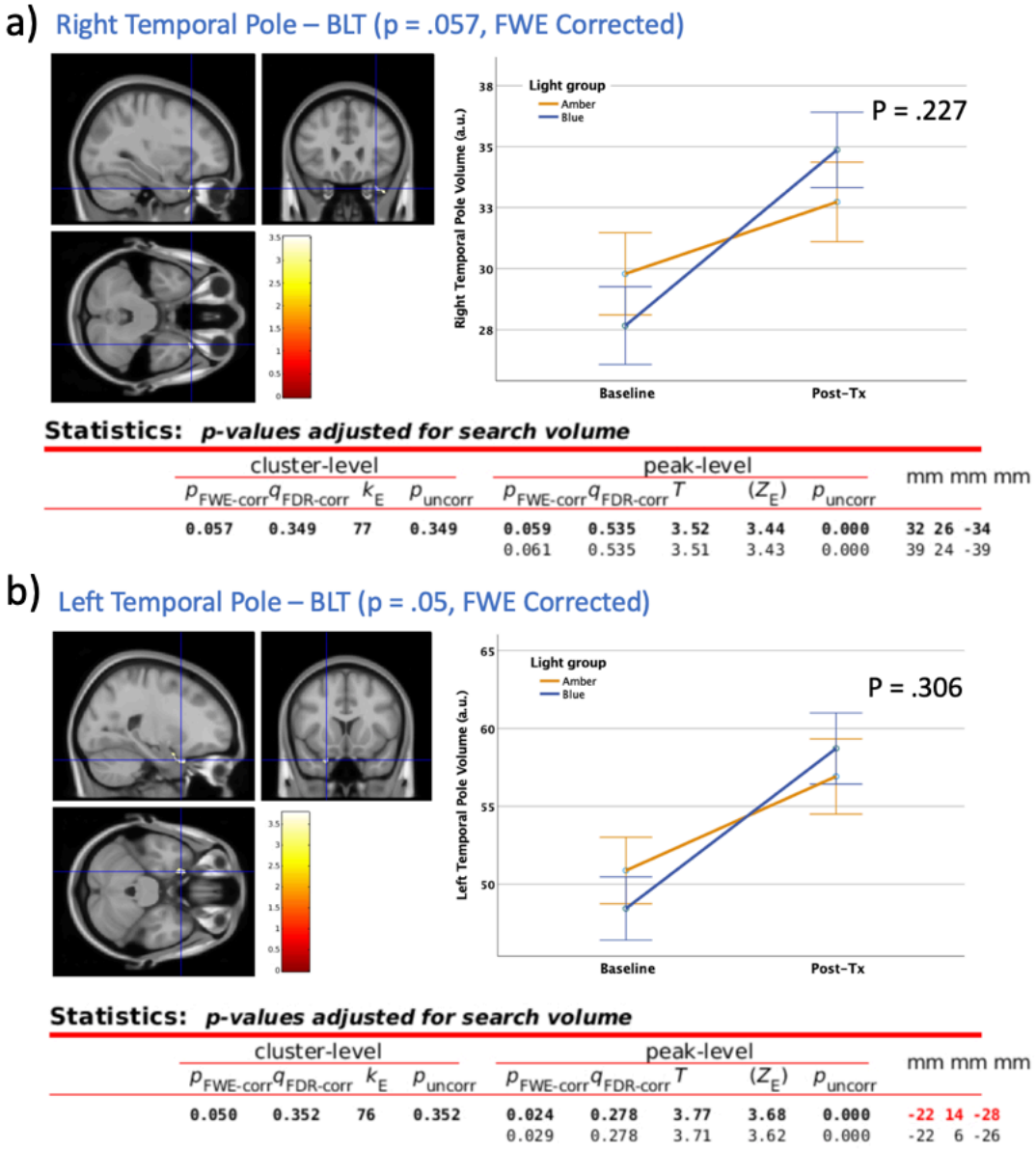


Figure S10. a) Right Temporal Pole: The left panel shows the region of the right temporal pole (k = 77) that showed a marginally significant increase in GMV from baseline to post-treatment for the BLT group (p = .057, FWE small volume cluster corrected). SPM12 statistics are shown in the bottom panel. The right panel shows the non-significant (p = .16) interaction between light condition and testing session. B) Left Temporal pole. The left panel shows the region of the left temporal pole (k = 76) that showed a significant increase in GMV from baseline to post-treatment for the BLT group (p = .050, FWE small volume cluster corrected). SPM12 statistics are shown in the bottom panel. The right panel shows the non-significant (p = .31) interaction between light condition and testing session.

Medial Prefrontal Cortex Volume. The medial prefrontal regions of the cortex, particularly the ventromedial prefrontal cortex (vmPFC) has been suggested to play an important role in regulating emotional responses and activation patterns in the amygdala in patients with PTSD (Rauch et al., 2006). Moreover, patients with PTSD have been shown to have reduced GMV within the medial prefrontal cortex relative to trauma exposed controls (Meng et al., 2016). We specifically interrogated the changes in GMV within the medial regions of the prefrontal cortex from pre-to-post-treatment for the BLT and ALT groups. However, here we found no differences between light conditions or interactions with session for any analyses within the medial prefrontal cortex.

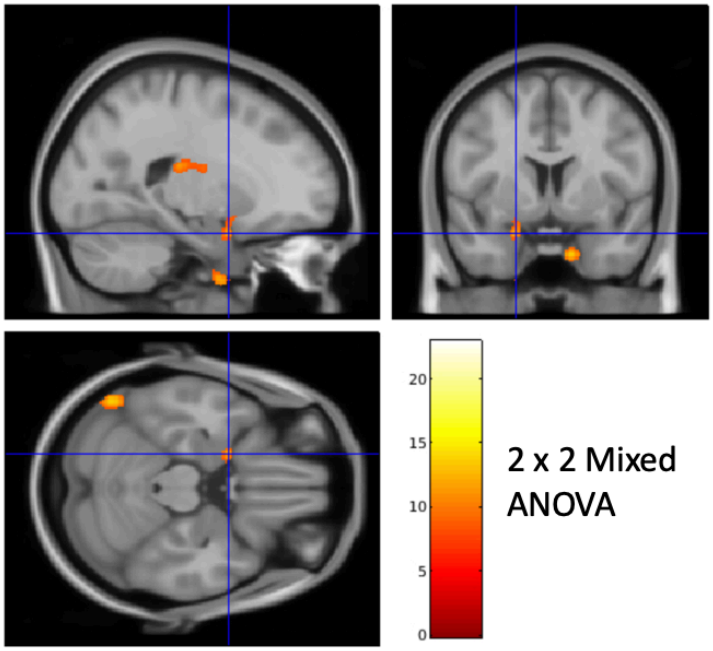
Dorsal Anterior Cingulate Cortex (dACC) Volume. Patients with PTSD have been shown to have enlarged GMV in the dACC (Zhang et al., 2018). Similarly, functional neuroimaging studies have also shown that the dACC may play an important role in a key feature of PTSD—namely, the failure to recall fear extinction memory and the behavioral expression of fear (Milad et al., 2009; Milad, Quirk, et al., 2007; Shin et al., 2009). Thus, we hypothesized that BLT would be associated with changes in GMV within the dACC. Therefore, we interrogated the changes in GMV within the dACC from pre-to-post-treatment for the BLT and ALT groups. However, in the present study, no differences between light conditions or interactions with session were found for any analyses within the dACC.

Exploratory GMV Analyses

In addition to the focused hypotheses described above, we were also interested in conducting exploratory analyses to identify additional patterns in the data that might be useful for guiding further research on the effects of light exposure therapies on brain structure and function. Initially, we conducted a whole-brain omnibus analysis of variance (ANOVA) to examine interactions between light condition (BLT vs. ALT) and time (pre to post-treatment). Then we also conducted whole brain cortical surface map comparisons among various conditions. These are described below:

Omnibus Light Condition by Session Interaction. An omnibus analysis of variance (ANOVA) showed that there was a significant interaction between Light Condition (Blue vs. Amber) on several regions of gray matter volume (GMV) at an overall uncorrected threshold of $p < .005$, $k = 100$. Notably, this omnibus test identified several key regions where pre-to-post-treatment changes were moderated by light condition (Blue vs. Amber). As shown in Figure S11, this 2 x 2 interaction included regions such as the left amygdala, left putamen, left posterior thalamus, and the left lateral cerebellum. These outcomes will be analyzed and decomposed in greater depth in subsequent sections. *These findings suggest that blue light may modulate changes in GMV within the emotional neurocircuitry that affect symptoms of PTSD.*

Additionally, we provide a surface rendering colormap in Figure S12 below showing the general trends of this interaction. Warmer colors represent areas where the GMV was modulated by light condition from pre- to post- treatment while cooler colors indicate regions that did not show an interaction between light condition and test session.



Statistics: ***p-values adjusted for search volume***

set-level		cluster-level				peak-level					mm	mm	mm
p	c	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	F	(Z_E)	p_{uncorr}			
1.000	8	0.999	0.627	343	0.098	0.228	0.087	22.91	4.46	0.000	-34	-9	-12
		0.999	0.627	322	0.108	0.981	0.666	15.83	3.70	0.000	-56	-64	-26
		1.000	0.810	114	0.328	0.999	0.786	14.20	3.49	0.000	14	3	-36
		1.000	0.627	268	0.139	1.000	0.786	13.03	3.34	0.000	-24	-22	20
						1.000	0.927	9.10	2.74	0.003	-21	-10	18
		1.000	0.810	105	0.348	1.000	0.786	12.32	3.24	0.001	-21	0	-51
		1.000	0.810	133	0.291	1.000	0.786	12.17	3.22	0.001	-21	4	-22
						1.000	0.921	9.78	2.86	0.002	-24	-3	-28
						1.000	0.927	8.86	2.70	0.003	-22	6	-14
		0.991	0.627	425	0.068	1.000	0.786	11.58	3.13	0.001	-6	-48	-50
						1.000	0.786	11.22	3.08	0.001	2	-48	-46
						1.000	0.805	10.57	2.98	0.001	-6	-45	-39
		1.000	0.810	100	0.360	1.000	0.786	11.19	3.08	0.001	-4	-15	-12

Figure S11. Voxel based morphometry (VBM) output for the omnibus F-test of the 2 (Blue vs. Amber) x 2 (Pre-Tx vs Post-Tx) analysis of variance (ANOVA). Overall, there were differences within several key areas involved in emotional and information processing, including the left amygdala, inferior left insula and putamen, and left thalamus, among others. Data thresholded at $p < .005$, $k = 100$.

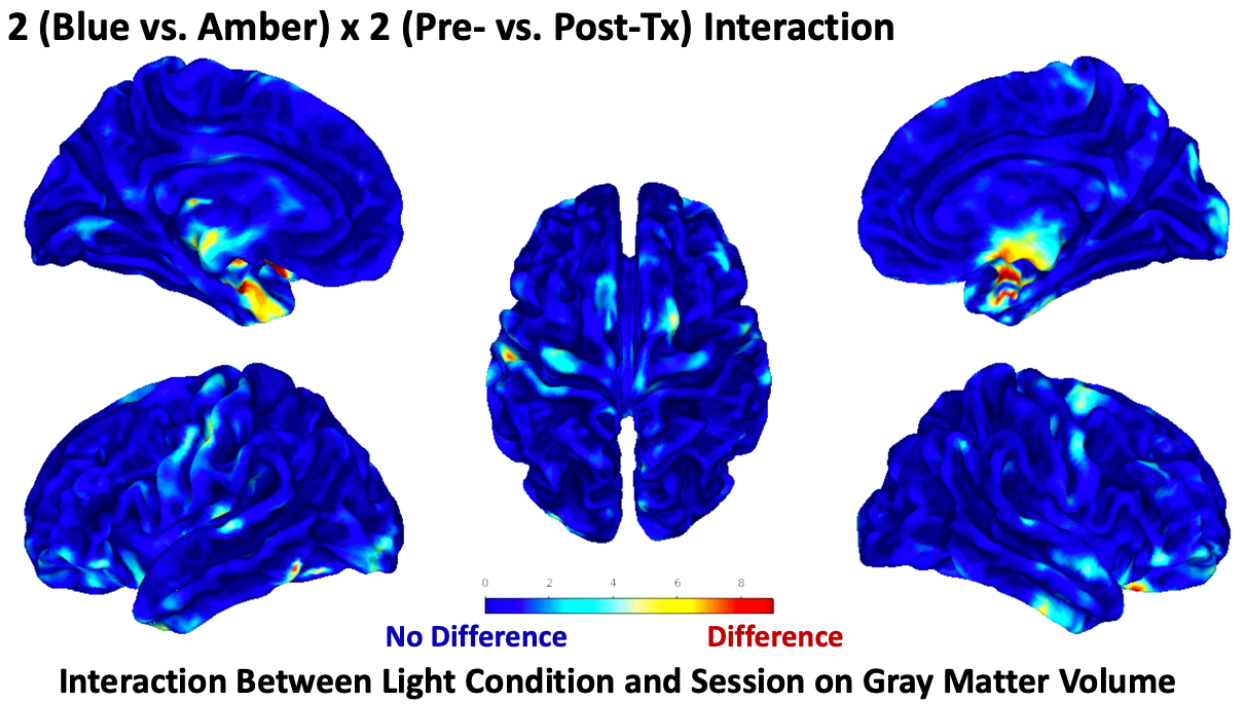


Figure S12. The figure shows 3D cortical maps of the 2 (light condition) x (session) interaction. Warmer colors indicate greater change in GMV from pre- to post-treatment that is modulated by light color. The leftmost images show the medial (top) and lateral (bottom) views of the left hemisphere. The middle figure represents a top (superior) view of the cortex. The rightmost images represent the medial (top) and lateral (bottom) aspects of the right cerebral hemisphere. From the figure, it is clear that most of the modulation of GMV by light condition was evident within the medial temporal regions (i.e., amygdala) and insular cortex, which are often associated with emotional experience.

Next, we decomposed the significant interaction by contrasting the changes from baseline to post-treatment between the two light condition groups, inclusively masked by the regions that were significant in the 2 x 2 ANOVA above, with an uncorrected height threshold of $p < .001$, followed by cluster correction for the interrogated volumes. This was done first to identify regions where BLT was associated with a greater increase in GMV than placebo ALT. The second contrast determined regions that showed significant reductions in GMV for BLT relative to ALT. Each of these will be presented in turn below.

Increased GMV from Pre- to Post-Treatment. As shown in Figure S13, within the masked regions previously identified in the omnibus F-test above (see Figure S11), we find that BLT was associated with sustainment of GMV within the left insular cortex (MNI: x = -34, y = -9, z = -12) from baseline to post-treatment, while ALT was associated with a decline in GMV within this region over the same period (p = .012, FWE cluster corrected). Figure S13 shows the differences in GMV change within the left insula between the ALT and BLT groups over the 6-week treatment period.

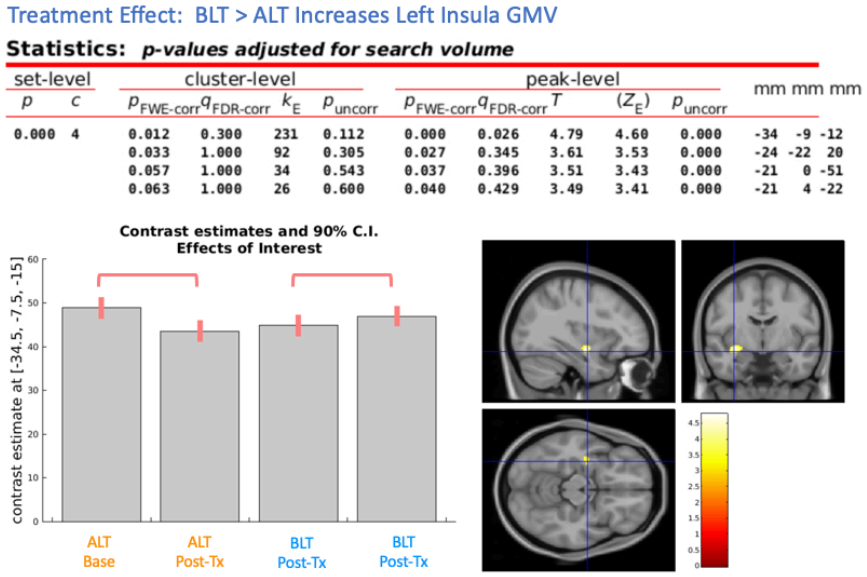


Figure S13. The omnibus F-test was decomposed by contrasting the pre-to-post-treatment change in GMV for each group, spatially constrained by the voxels that were significant in the original interaction analysis. The top table shows the significant clusters of interaction ($p < .05$, FWE corrected for small volume). The bottom left figure shows the contrast estimates for the Amber Light Treatment (ALT) and Blue Light Treatment (BLT) for the left insula. Overall, ALT was associated with a reduction in left insula GMV, while BLT did not show such reductions over time. The significant cluster is shown in the figure on the bottom right.

The second row in table in Figure S13 shows the corrected cluster significance for the left thalamus interaction (p = .033, FWE cluster corrected). The location of this cluster is shown in Figure S14 along

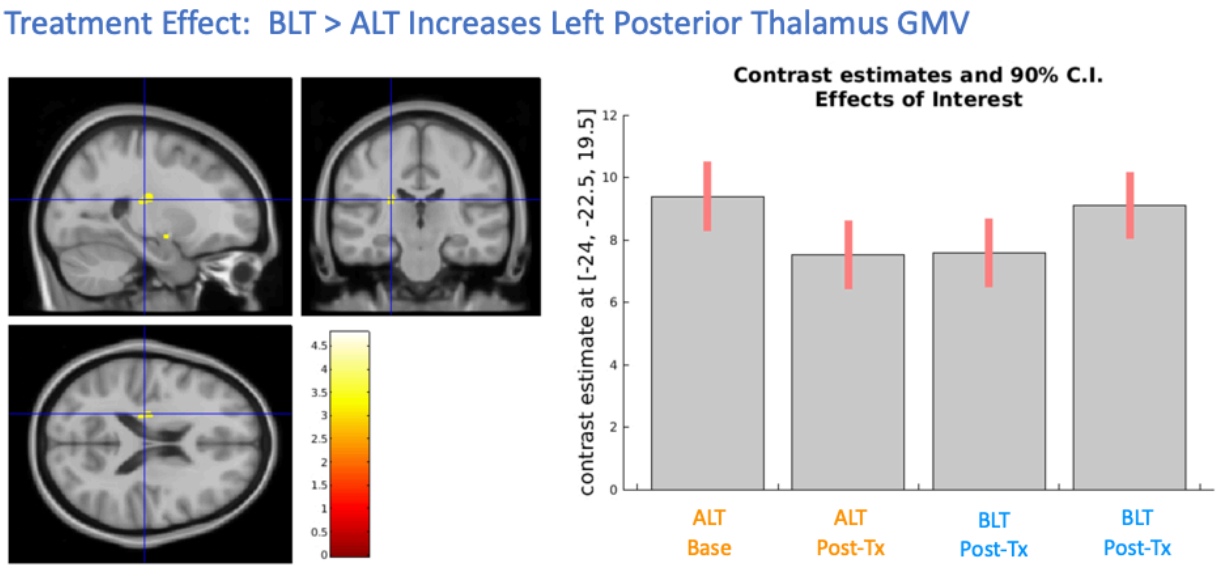


Figure S14. This figure complements the data table in Figure S8 above. The left figure shows the spatial location where BLT was associated with increased volume of the posterior thalamus, while ALT was associated with no significant change. The right figure shows the contrast estimates for the Amber Light Treatment and Blue Light Treatment groups at baseline and after six weeks of treatment. Thalamic GMV clearly declines for ALT and increases for BLT.

with the associated contrast estimates. Essentially this analysis partially corroborates the analysis conducted for the hypothesized effect in the preceding section shown in Figure S8 and further suggests that GMV within the left thalamus increases significantly during BLT but not ALT.

The bottom row in table in Figure S14 shows the corrected cluster significance for a small region of the left amygdala and is shown in Figure S15. Essentially this analysis corroborates the analysis conducted for the hypothesized effect in the preceding section shown in Figure S9 and further suggests that GMV within the left amygdala increases significantly during BLT but not ALT.

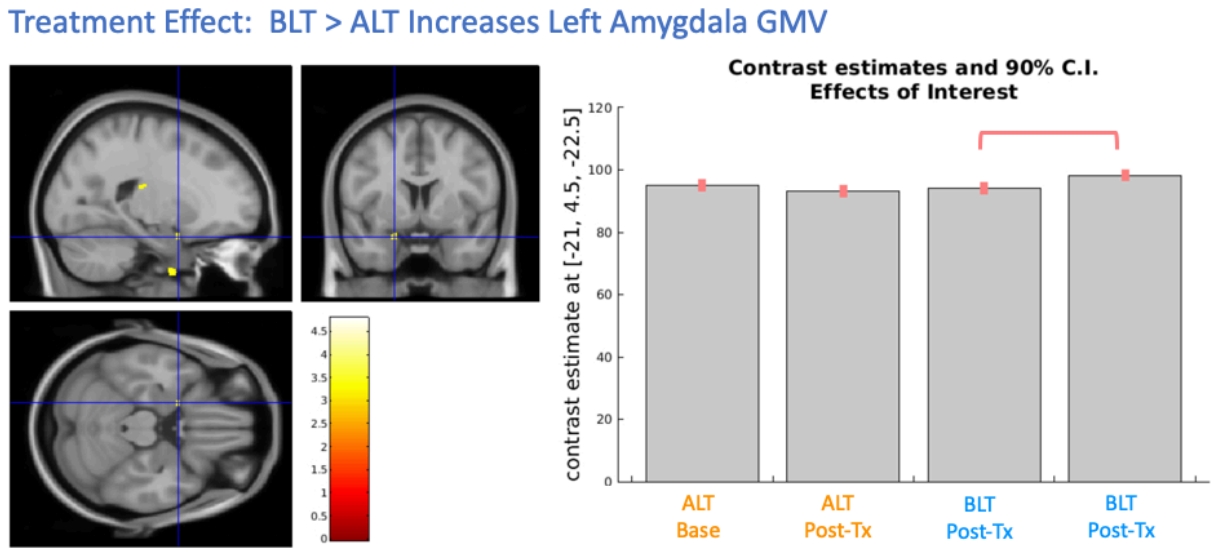


Figure S15. This figure complements the data table in Figure S13 above. The left figure shows the spatial location where BLT was associated with increased volume of the amygdala, while ALT was associated with no significant change. The right figure shows the contrast estimates for the Amber Light Treatment and Blue Light Treatment groups at baseline and after six weeks of treatment.

These findings suggest that six weeks of BLT was associated with increased gray matter volume within the left insula, left posterior thalamus, and left amygdala.

Reduced GMV from Pre- to Post-Treatment. We also examined the alternative contrast within the regions identified by the omnibus F-test. This contrast was designed to identify regions where the magnitude of GMV decreased from baseline to post-treatment for the BLT group relative to the ALT group. As shown in Figure S16, this analysis revealed that two of the clusters shown in the omnibus test in Figure S6 demonstrated this pattern. The first region is a cluster within the left cerebellar crus (MNI: x = -56, y = -63, z = -26). As shown in the figure, this area showed a decline in volume from pre- to post-treatment for the BLT group, but this was not present in the ALT group.

Treatment Effect: BLT > ALT Decreases Left Cerebellum Crus

Statistics: ***p-values adjusted for search volume***

set-level		cluster-level				peak-level					mm mm mm
p	c	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}	
0.000	4	0.015	0.283	202	0.135	0.008	0.260	3.98	3.87	0.000	-56 -64 -26
		0.044	1.000	59	0.414	0.017	0.337	3.77	3.67	0.000	14 3 -36
		0.025	0.283	124	0.235	0.051	0.580	3.40	3.33	0.000	-6 -48 -50
						0.059	0.654	3.35	3.28	0.001	2 -48 -46
						0.078	1.000	3.25	3.19	0.001	-6 -45 -39
		0.065	1.000	24	0.616	0.060	0.654	3.35	3.28	0.001	-4 -15 -12

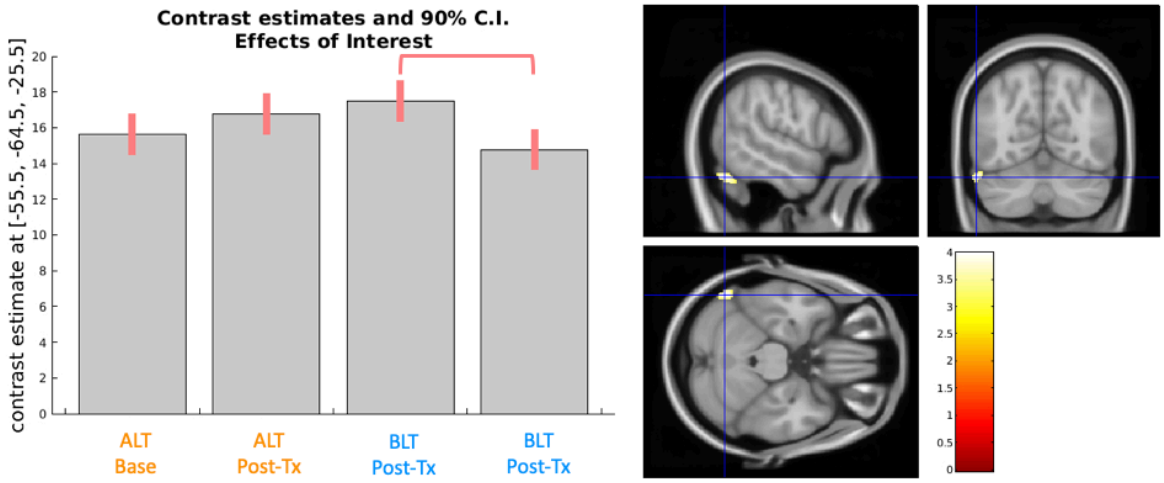


Figure S16. The top table shows the regions where there was a significant interaction comprising reduced GMV for BLT relative to ALT. The lower left figure shows the contrast estimates for the ALT and BLT groups at baseline and post-treatment. The lower right figure shows the spatial location where BLT was associated with reduced GMV of the left cerebellum.

The second potentially meaningful cluster that emerged (MNI: x = -6, y = -48, z = -26) as showing a significant (p = .025, FWE cluster corrected) interaction was located in the medial region of cerebellar region 9. As shown in Figure S17, this area showed a decline in volume from pre- to post-treatment for the BLT group, and an increase in volume in the ALT group.

These findings suggest that six weeks of BLT was associated with reduced gray matter volume within the in the right nucleus accumbens compared to placebo.

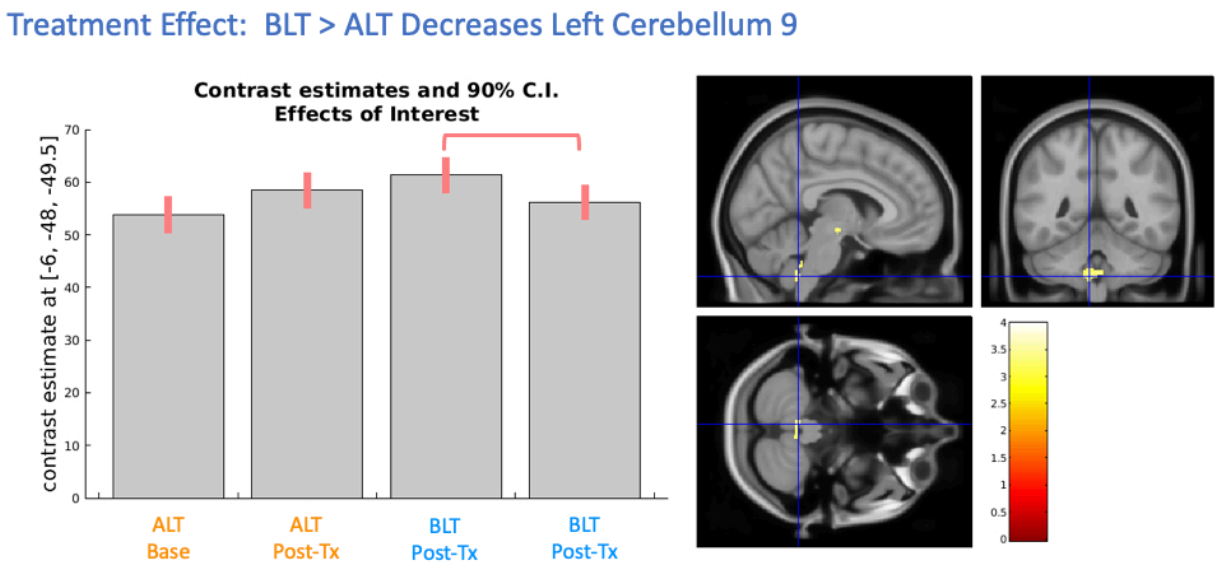


Figure S17. The left figure shows the right nucleus accumbens (NAc) contrast estimates for the ALT and BLT groups at baseline and post-treatment. The lower right figure shows the spatial location where BLT was associated with reduced GMV of the right NAc).

Whole Brain Cortical Surface Maps

Cortical Surface GMV Changes from Baseline to Post-Treatment. For completeness in reporting, this section presents global within-subject GMV changes on the cortical surface, after controlling for sex, age, and total intracranial volume at baseline and post-treatment, as well as implementation of stringent statistical correction for multiple comparisons using whole brain FWE correction of $p < .05$. Overall, as most regions do not meet this stringent criterion for significance, we also present unthresholded color maps of the within-subjects differences in GMV. While these maps do not reflect statistical significance, they show the magnitude of the T-map differences from pre-to-post-treatment. The T maps are maintained at a standard scaling ranging from -4.0 to 4.0 to facilitate ease of comparison.

Figure S18 shows separate cortical surface volume maps reflecting the change from pre- to post-treatment for ALT and BLT separately. Although these findings do not reflect statistical significance, cooler colors reflect trends toward decreases in GMV from baseline to the 6-week post-treatment follow-up scan, while warmer colors reflect increases in GMV during that time. Overall, both groups showed similar patterns of change, with increased thalamic volume evident in both groups. However, it is clear that the BLT group showed noticeably greater reductions in GMV within the ventral striatal area, posterior cingulate. In contrast, the maps also show a noticeable decrease in left insular volume in the ALT group that is less pronounced in the BLT group.

Figure S19 shows the interaction analysis that expresses regions where BLT leads to greater changes than ALT. Warmer colors reflect regions where BLT leads to greater increases in GMV over the 6-week

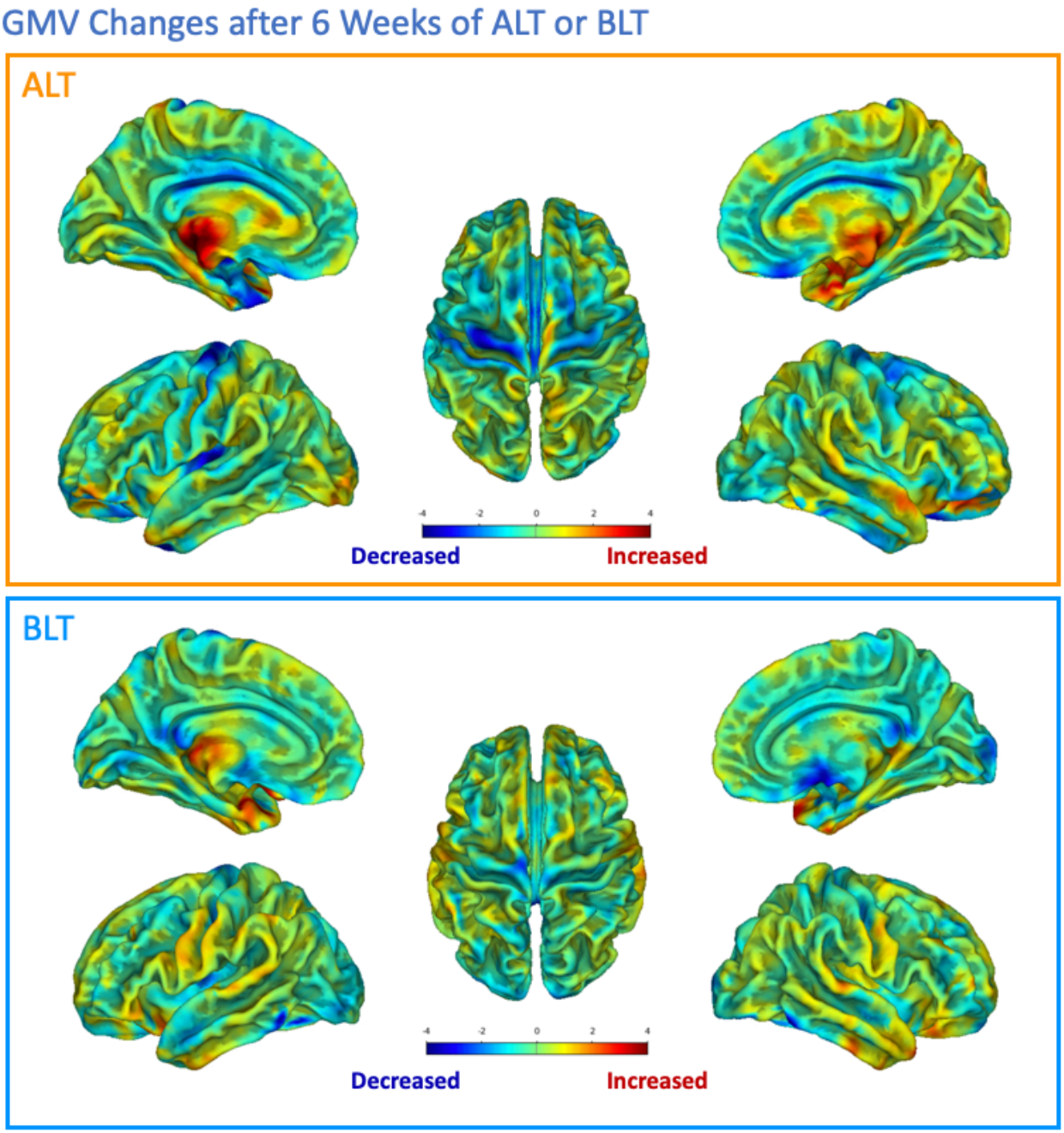


Figure S18. Cortical surface maps reflecting T-values of change from baseline to post-treatment. Left hemisphere medial (upper) and lateral (lower) are shown on the left; the superior view of the brain is shown in the middle (anterior to the top)' the right hemisphere medial (upper) and lateral (lower) are shown on the right side of each image. The top panel reflects change in the Amber Light Treatment (ALT) and the bottom panel reflects change in the Blue Light Treatment (BLT) group. Cooler colors reflect decreased gray matter volume (GMV) over the six-week treatment, while warmer colors reflect increases in GMV over that time. The colorbar shows the range of T-values, but does not reflect statistical significance.

treatment period relative to ALT, while cooler colors reflect regions where BLT leads to greater decreases in GMV over the 6-week treatment period compared to ALT.

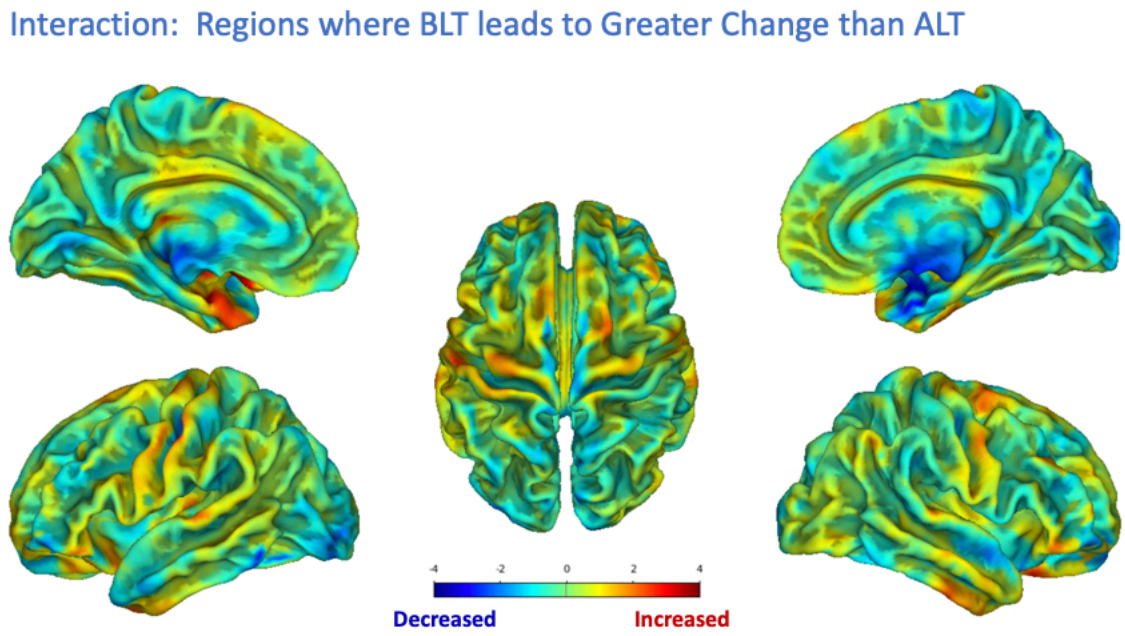


Figure S19. Cortical surface maps reflecting the interaction between light condition (BLT v. ALT) and time (Baseline vs. Post-Treatment). Left hemisphere medial (upper) and lateral (lower) are shown on the left; the superior view of the brain is shown in the middle (anterior to the top)' the right hemisphere medial (upper) and lateral (lower) are shown on the right side of each image. The top panel reflects change in the Amber Light Treatment (ALT) and the bottom panel reflects change in the Blue Light Treatment (BLT) group. Cooler colors reflect decreased gray matter volume (GMV) over the six week treatment, while warmer colors reflect increases in GMV over that time. The colorbar shows the range of T-values, but does not reflect statistical significance.

Cortical Surface GMV Correlations. Additionally, for completeness in reporting, we conducted specific analyses on the changes in GMV that were associated with changes in important clinical outcome variables relevant to PTSD. Change scores in each clinical outcome variable from pre- to post-treatment were calculated. Similarly, changes in the GMV maps from pre- to post-treatment were calculated by subtraction using the ImCalc feature in SPM12. The change scores in clinical measures were entered into a multiple regression analysis in SPM12, with GMV change maps as the outcome variable, with nuisance regressors including age, sex, and mean intracranial volume. To facilitate future research, initial SPM12 correlations were assessed at $p < .001$ (uncorrected) with a FDR corrected spatial extent threshold of $p < .05$. Only correlations showing significant effects following this correction for multiple comparisons will be presented. However, to facilitate further research, we also present unthresholded cortical surface maps to show trends in the associations of changes in each variable with changes in GMV over the course of treatment.

Beck Depression Inventory (BDI). As depressive mood is common among individuals with PTSD, we examined the correlation between changes in depressive mood on the BDI and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in BDI scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S20). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

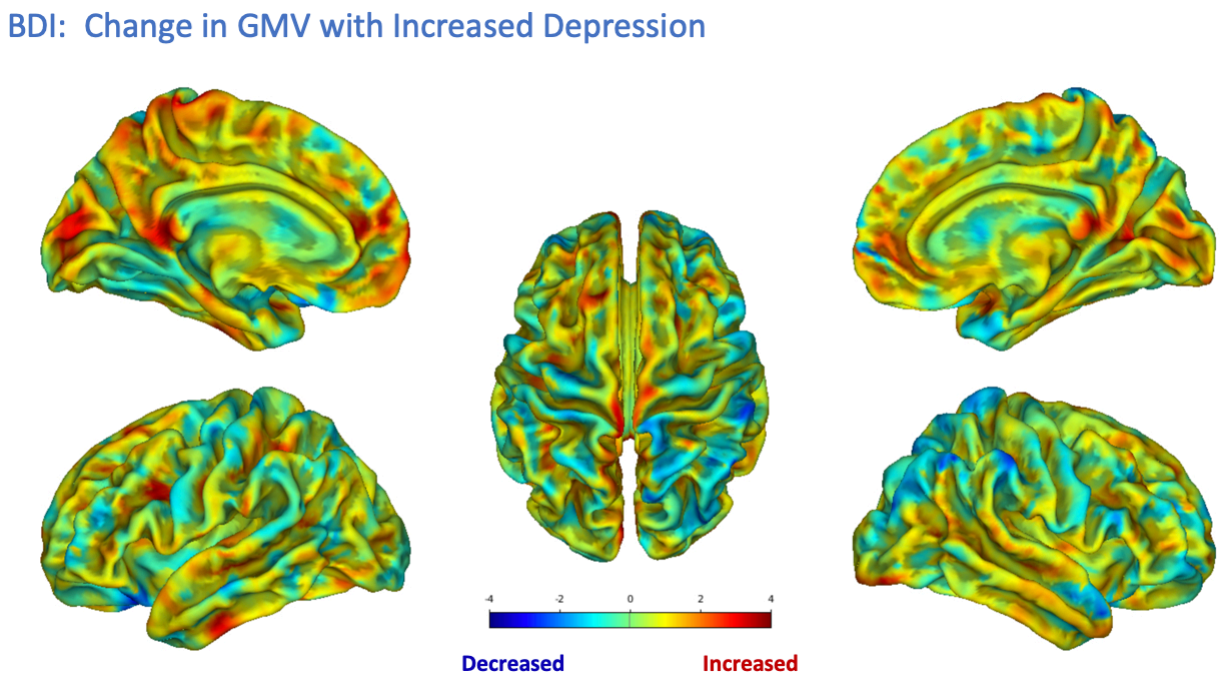


Figure S20. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased depressive mood on the Beck Depression Inventory (BDI) over the 6-week period of the study. Warm colors indicate regions where increased depressive mood was associated with increased GMV, while cooler colors represent regions where greater increases in depressive mood were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Patient Health Questionnaire-9 (PHQ-9). In addition to the assessment of depression from the BDI described above, we also utilized the commonly used PHQ-9. Here we analyzed the correlation between changes in self-reported depression on the PHQ-9 and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in BDI scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S21). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

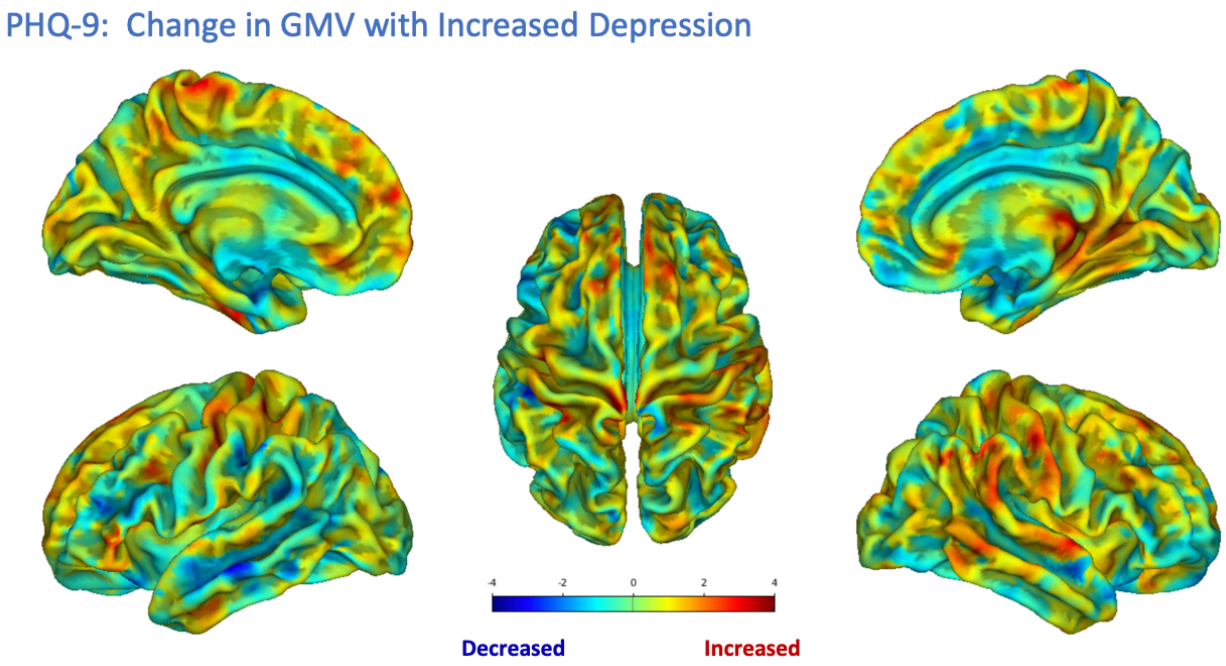


Figure S21. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased depressive mood on the Patient Health Questionnaire (PHQ-9) over the 6-week period of the study. Warm colors indicate regions where increased depressive mood was associated with increased GMV, while cooler colors represent regions where greater increases in depressive mood were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

State-Trait Anxiety Inventory—State Anxiety (STAI-S). Increased state anxiety is common among individuals with PTSD. Therefore, we examined the correlation between changes in self-reported state anxiety (i.e., STAI-S) and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in STAI-S scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S22). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

Interestingly, there were a number of relatively large correlations that did not survive multiple comparison correction, but suggested a possible trend association between changes in state-anxiety and GMV.

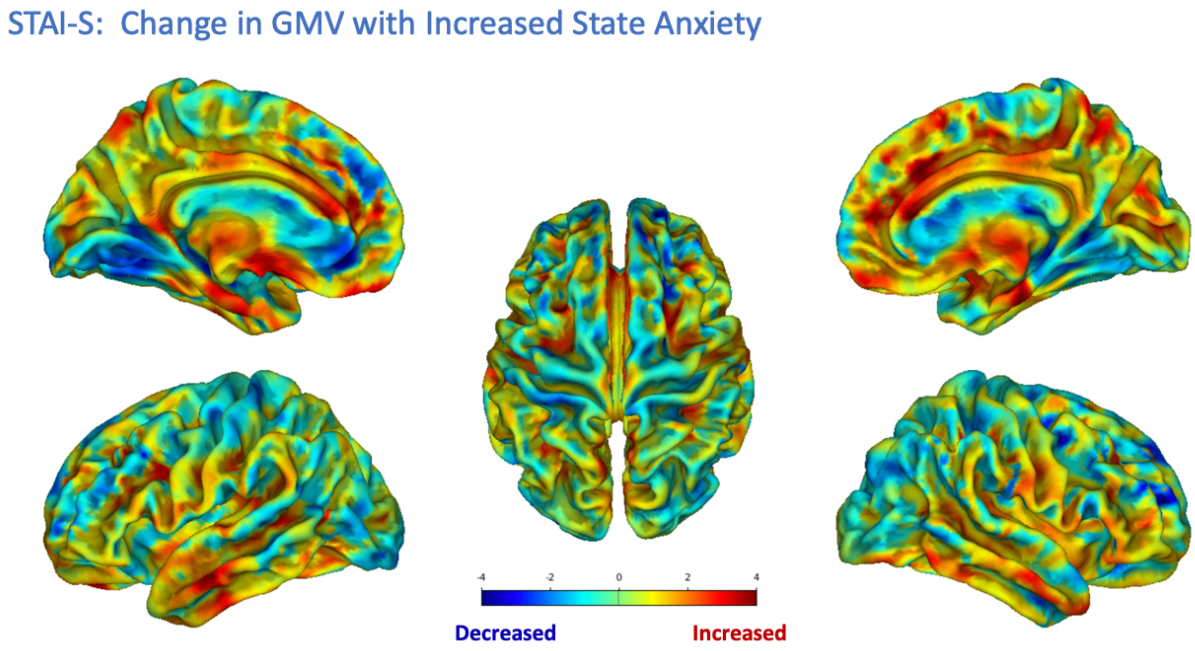


Figure S22. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased state anxiety on the State-Trait Anxiety Inventory (STAI-S) over the 6-week period of the study. Warm colors indicate regions where increased state anxiety was associated with increased GMV, while cooler colors represent regions where greater increases in state anxiety were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

State-Trait Anxiety Inventory—Trait Anxiety (STAI-T). Elevated trait anxiety is common among individuals with PTSD. Therefore, we examined the correlation between changes in self-reported trait anxiety (i.e., STAI-T) and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in STAI-T scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S23). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

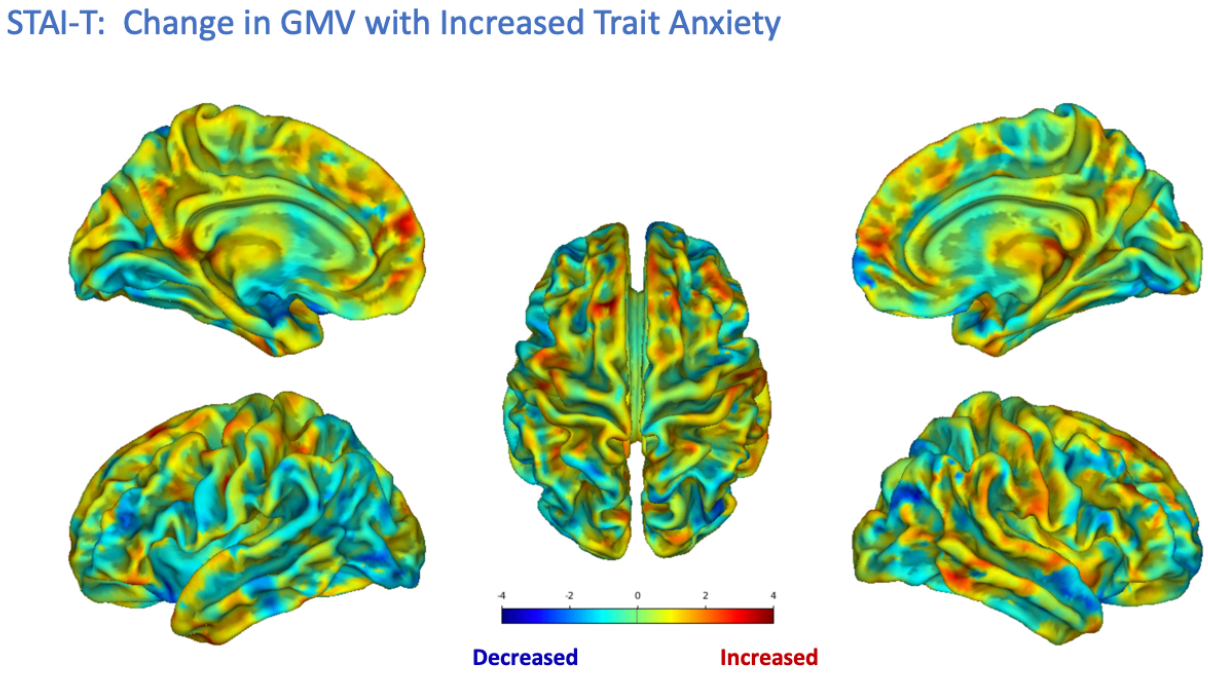


Figure S23. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased trait anxiety on the State-Trait Anxiety Inventory (STAI-T) over the 6-week period of the study. Warm colors indicate regions where increased trait anxiety was associated with increased GMV, while cooler colors represent regions where greater increases in trait anxiety were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Satisfaction with Life Scale (SWS). Due to the difficulties associated with PTSD, many patients report lower than average satisfaction with life. Therefore, we examined the correlation between changes in self-reported satisfaction with life (i.e., SWLS) and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in SWLS scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S24). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

Although the findings were not statistically significant, it is clear from the figure that many of the trends were in the negative direction (i.e., greater increases in satisfaction with life were associated with greater decreases in GMV in numerous cortical regions).

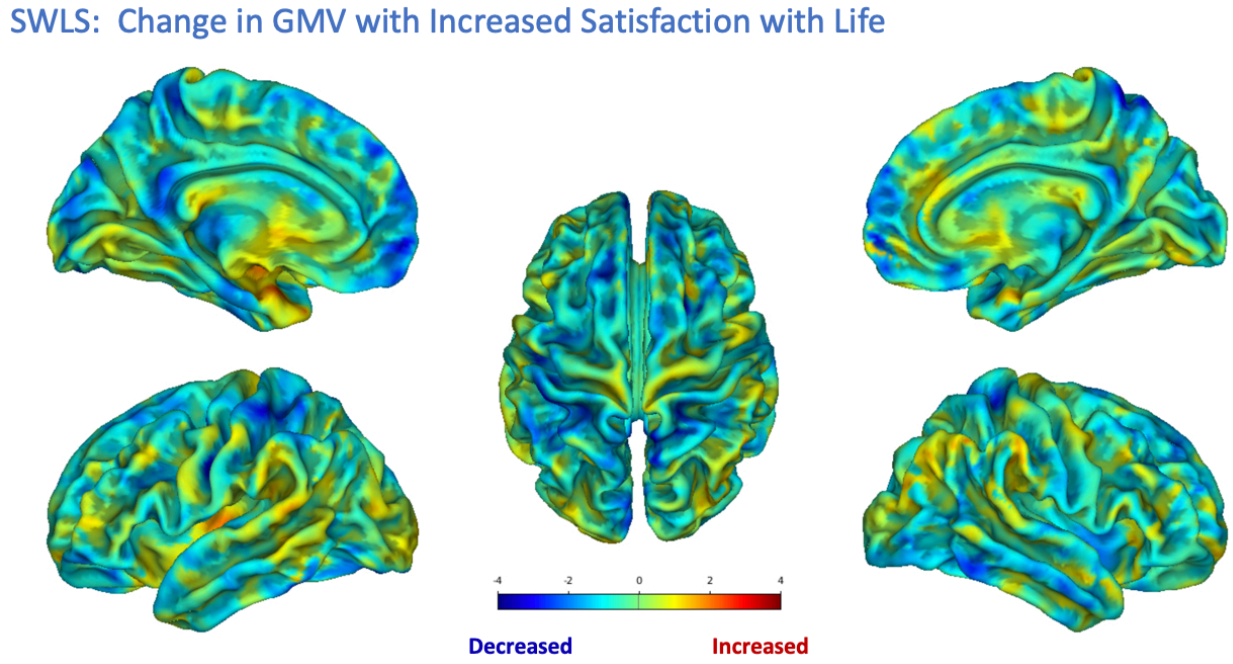


Figure S24. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased satisfaction with life on the Satisfaction with Life Scale (SWLS) over the 6-week period of the study. Warm colors indicate regions where increased life satisfaction was associated with increased GMV, while cooler colors represent regions where greater increases in life satisfaction were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Connor-Davidson Resilience Scale (CD-RISC). The trait of resilience is often reduced among individuals who have developed PTSD. Therefore, we examined the correlation between changes in self-reported resilience (i.e., CD-RISC) and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CD-RISC scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S25). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

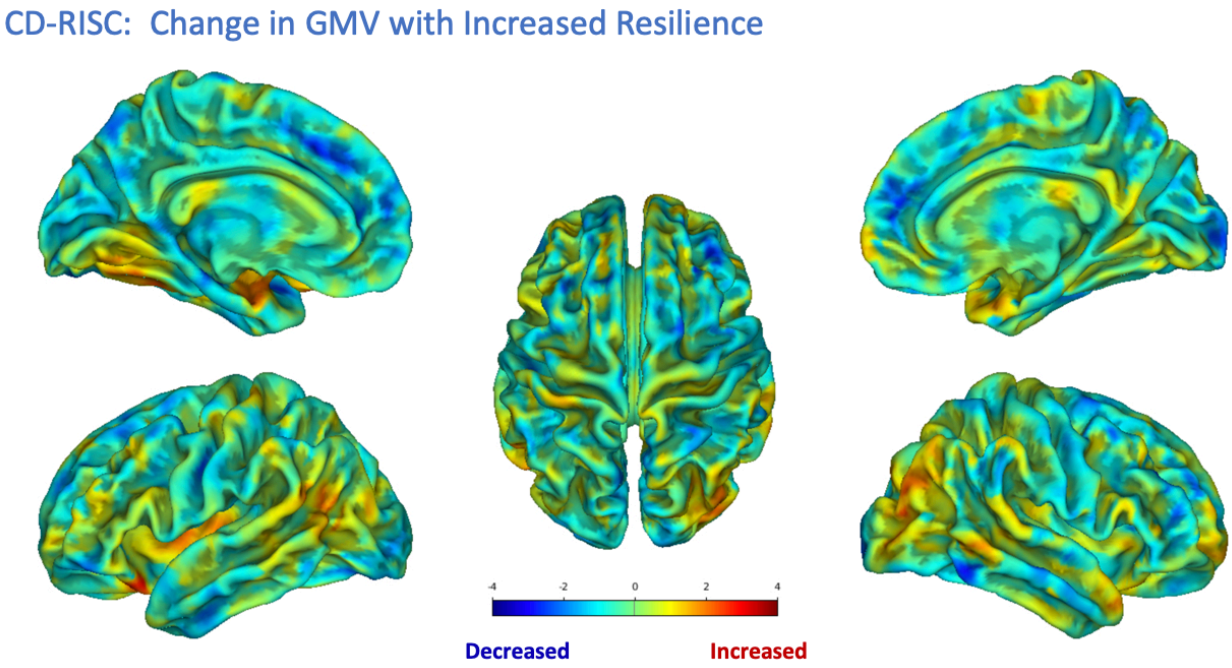


Figure S25. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased resilience on the Connor-Davidson Resilience Scale (CD-RISC) over the 6-week period of the study. Warm colors indicate regions where increased resilience was associated with increased GMV, while cooler colors represent regions where greater increases in resilience were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

PTSD Symptom Checklist-5 (PCL-5). The PCL-5 is one of the gold standard metrics for assessing PTSD in research studies. Improvement in PCL-5 scores is considered to be a hallmark indicator of improvement in clinical symptoms of the disorder. Therefore, we examined the correlation between changes in PTSD symptoms on the PCL-5 and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in PCL-5 scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S26). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

While there were no statistically significant clusters after correction for multiple comparisons, it is clear from the whole brain maps in the figure that an increase in PTSD symptoms during the treatment period was associated with a trend toward increased right medial volume near the thalamus and reduced GMV within broad regions of the left hemisphere lateral cortex (i.e., regions associated with language processing). These may represent areas for further research in the phenomenology of PTSD.

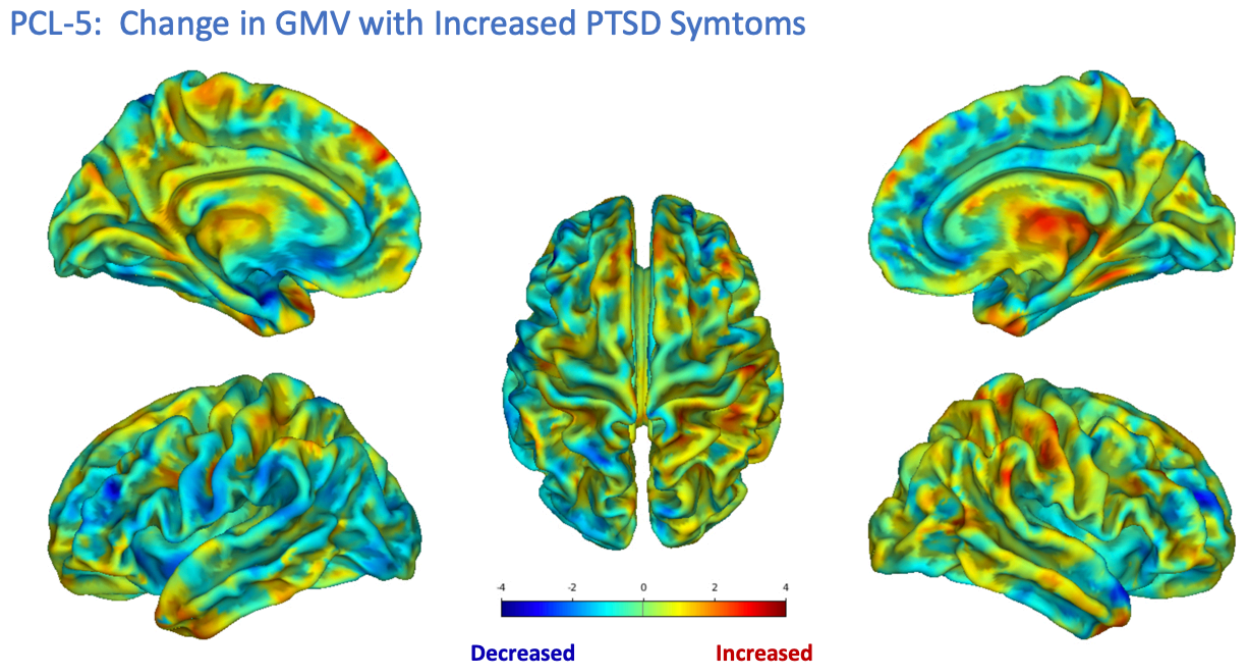


Figure S26. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased symptoms of PTSD (PCL-5) over the 6-week period of the study. Warm colors indicate regions where increased PTSD symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Insomnia Severity Index (ISI). Sleep related complaints, including insomnia, are among the most common symptoms of PTSD. Therefore, we examined the correlation between changes in insomnia severity (i.e., ISI) and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in ISI scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S27). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

In an earlier section, we showed that BLT was particularly associated with an increase in the GMV of the left amygdala. Here, we further explored this association across the entire sample by constraining the search area to the same left amygdala region of interest (ROI) and correlating GMV with ISI scores. As evident in Figure S28, greater increases in left amygdala volume over the 6-weeks of the study were associated with reduced ISI scores, while reduced volume of this area was associated with an increase in the severity of insomnia. This suggests that the left amygdala volume may play an important role in the phenomenology of insomnia in individuals with PTSD.

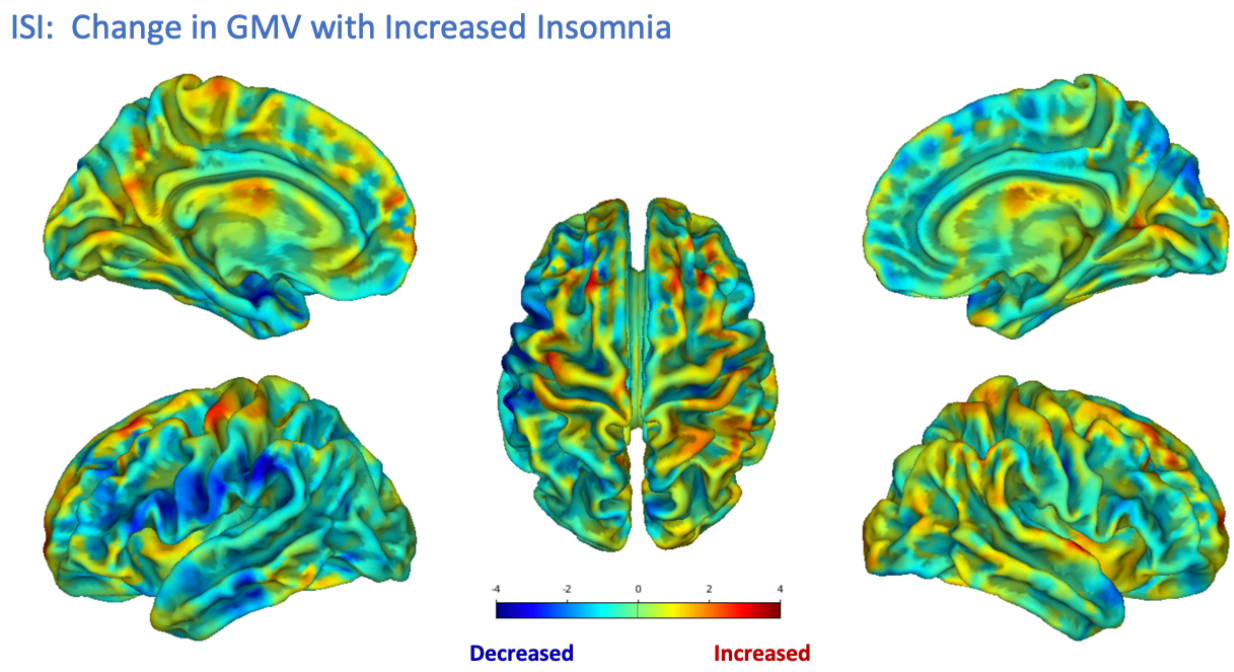


Figure S27. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased symptoms of insomnia (ISI) over the 6-week period of the study. Warm colors indicate regions where increased insomnia severity was associated with increased GMV, while cooler colors represent regions where greater increases in insomnia severity was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Statistics: ***p-values adjusted for search volume***

cluster-level				peak-level					mm mm mm
$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}	
0.061	0.581	38	0.581	0.030	0.338	3.18	3.07	0.001	-26 2 -26

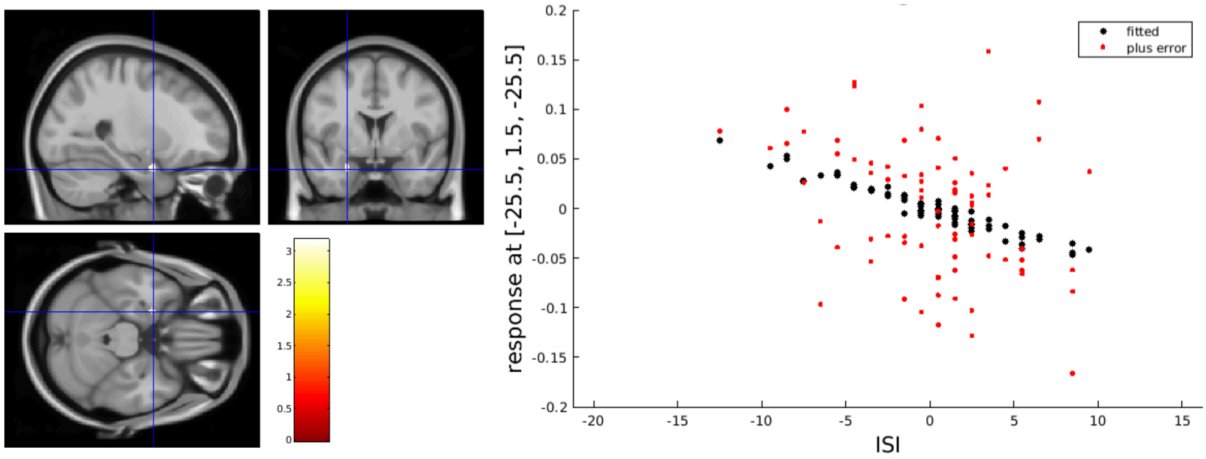


Figure S28. As the amygdala was found to be influenced by BLT in results described earlier, we also examined the change in the volume of the amygdala and its association with insomnia severity. Using a region of interest mask over the left amygdala, we find that greater reduction in left amygdala GMV over the course of the study was associated with an increase in insomnia severity (FWE corrected p = .061).

Epworth Sleepiness Scale (ESS). Individuals with PTSD often report excessive daytime sleepiness. Therefore, we examined the correlation between changes in daytime sleepiness on the ESS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in ESS scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S29). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

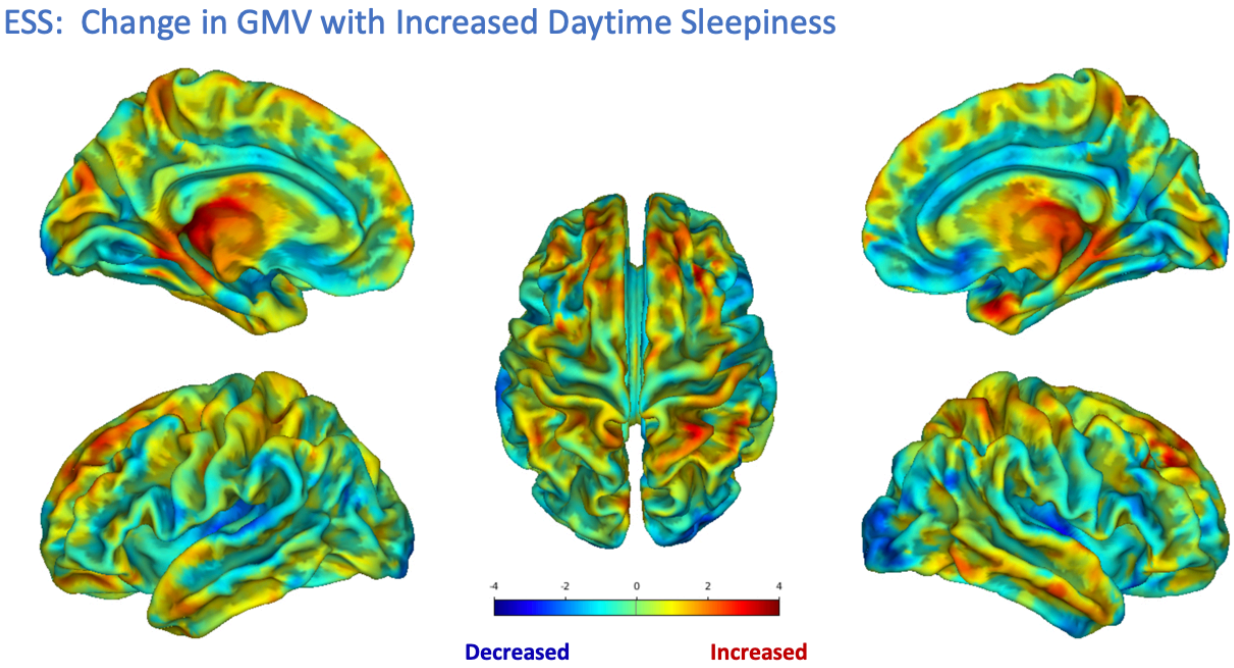


Figure S29. Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased daytime sleepiness on the Epworth Sleepiness Scale (ESS) over the 6-week period of the study. Warm colors indicate regions where increased daytime sleepiness was associated with increased GMV, while cooler colors represent regions where greater increases in daytime sleepiness was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Because one of our primary hypotheses in an earlier section also focused on the thalamus, we also conducted a region of interest (ROI) analysis by placing bilateral ROIs at the spatial location of the thalami. At a corrected height threshold of $p < .005$, we identified a region in the posterior left thalamus that is significantly correlated with increased ESS scores across the entire sample ($p = .008$, FWE cluster corrected for small volume). The associated location data and scatterplot are shown in Figure S30. These findings further support results presented earlier in the report and prior publications suggesting that the left posterior thalamus is affected by light therapy and plays an important role in sleepiness and alertness (Bajaj et al., 2017; Killgore et al., 2020; Raikes et al., 2021).

Statistics: ***p-values adjusted for search volume***

set-level		cluster-level				peak-level					mm	mm	mm
p	c	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}			
0.009	**2**	**0.008**	**0.119**	**251**	**0.041**	**0.030**	**0.651**	**3.93**	**3.71**	**0.000**	**-12**	**-32**	**8**
						0.099	0.651	3.48	3.32	0.000	-21	-27	0

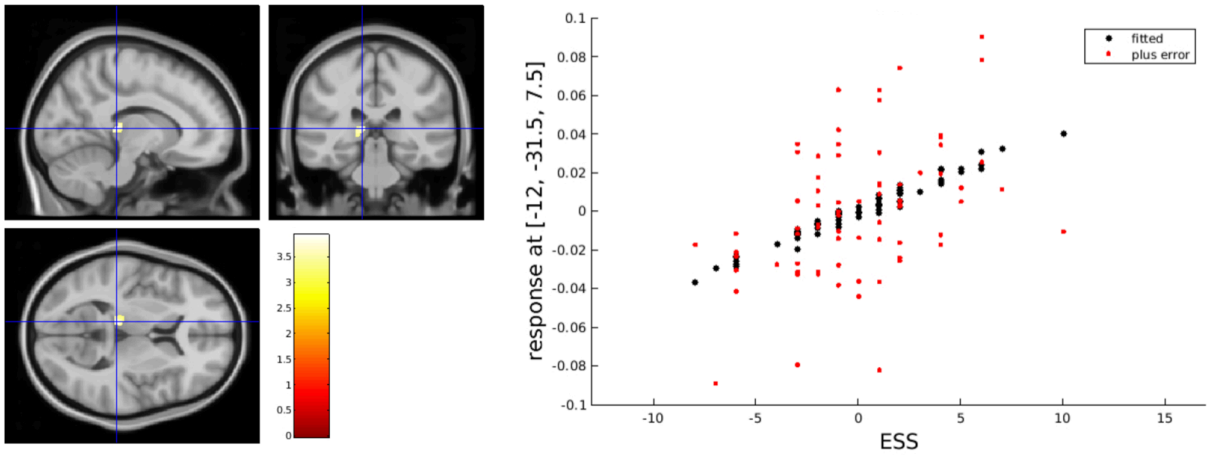


Figure S30. As the posterior left thalamus was found to be influenced by BLT in results described earlier, we also examined the change in the GMV within each thalamus would correlate with daytime sleepiness on the Epworth Sleepiness Scale (ESS). Using a bilateral region of interest mask over the left and right thalami, we find that greater increase in posterior left thalamic GMV over the course of the study was associated with an increase in daytime sleepiness (FWE cluster corrected $p = .008$).

Pittsburgh Sleep Quality Index (PSQI). Sleep problems are among the most commonly reported symptoms associated with PTSD. Therefore, we examined the correlation between changes in sleep disturbance as assessed by the PSQI and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in PSIQ scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S31). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

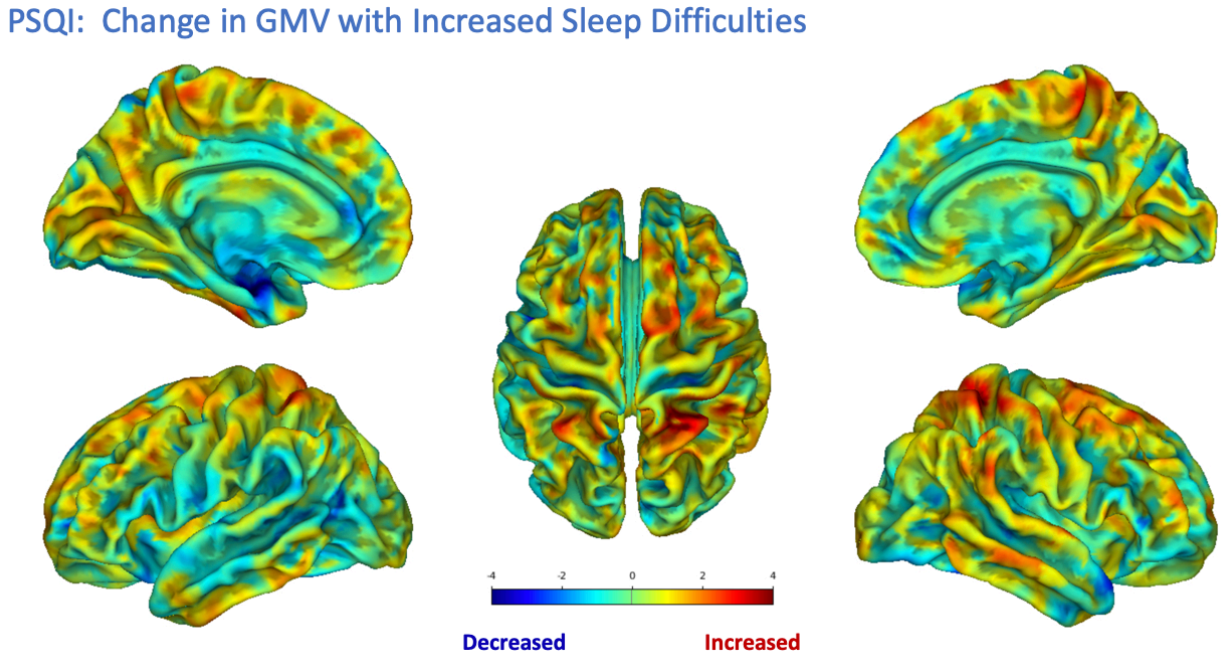


Figure S31 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased sleep problems on the Pittsburgh Sleep Quality Index (PSQI) over the 6-week period of the study. Warm colors indicate regions where increased sleep complaints were associated with increased GMV, while cooler colors represent regions where greater increases in sleep difficulties were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

In several previous analyses, we have shown that the GMV of the amygdala is increased with BLT and that this increase is associated with important outcomes, including reduced insomnia. Therefore, we also conducted a region of interest (ROI) analysis by placing an ROI at the spatial location of the left amygdala. At a corrected height threshold of $p < .001$, we identified a cluster where increased GMV over the course of treatment correlated with a reduction in sleep problems on the PSQI ($p = .011$, FWE cluster corrected for small volume). The associated location data and scatterplot are shown in Figure S32.

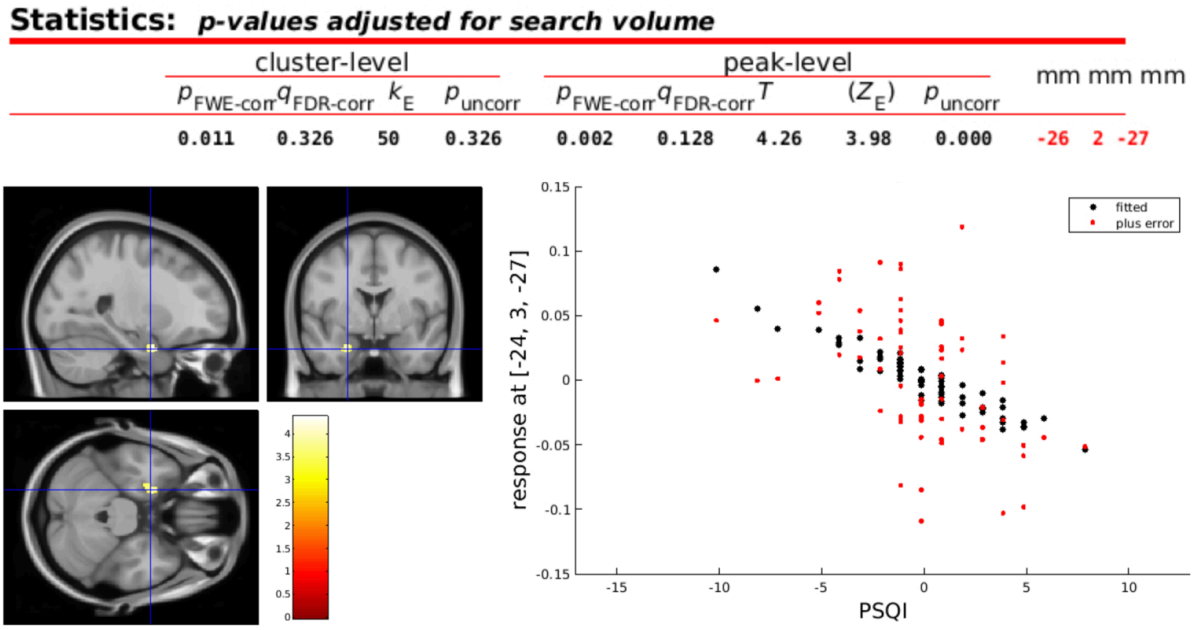


Figure S32. The left amygdala was found to be influenced by BLT in results described earlier. Therefore, we also examined whether the change in the GMV within the left amygdala would correlate with sleep problems on the Pittsburgh Sleep quality Index (PSQI). We find that greater increase in left amygdala GMV over the course of the study was associated with an increase in sleep problems (FWE cluster corrected p = .011).

Disturbing Dreams and Nightmares Severity Index (DDNSI). Nightmares are common among people recovering from PTSD. Therefore, we examined the correlation between changes in nightmare severity on the DDNSI and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in DDNSI scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S33). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

Of particular interest here, we see that increases in nightmare severity appear to be mostly predicted by individuals who showed a reduction in left medial temporal GMV, near the location of the left amygdala and left temporal pole regions.

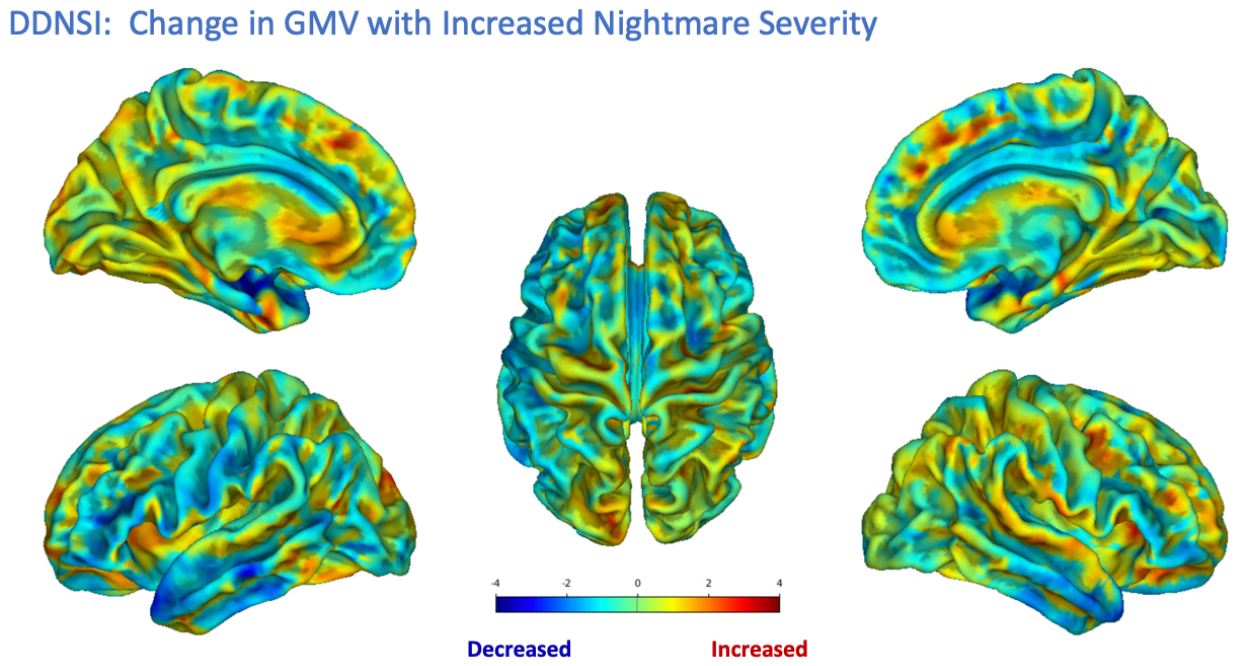


Figure S33 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased sleep problems on the Pittsburgh Sleep Quality Index (PSQI) over the 6-week period of the study. Warm colors indicate regions where increased sleep complaints were associated with increased GMV, while cooler colors represent regions where greater increases in sleep difficulties were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

As described in several sections above, the left amygdala has been associated with sleep quality and is affected by exposure to BLT. Therefore, we also conducted a region of interest (ROI) analysis by placing an ROI at the spatial location of the left amygdala. At a corrected height threshold of $p < .001$, we identified a small cluster (k = 16 voxels) where increased GMV over the course of treatment correlated with a reduction in sleep problems on the PSQI ($p = .019$, FWE cluster corrected for small volume). The associated location data and scatterplot for the peak voxel are shown in Figure S34.

Statistics: ***p-values adjusted for search volume***

cluster-level				peak-level					mm mm mm
$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	k_E	p_{uncorr}	$p_{FWE\text{-}corr}$	$q_{FDR\text{-}corr}$	T	(Z_E)	p_{uncorr}	
0.019	0.596	16	0.596	0.017	0.623	3.48	3.31	0.000	-28 -4 -24

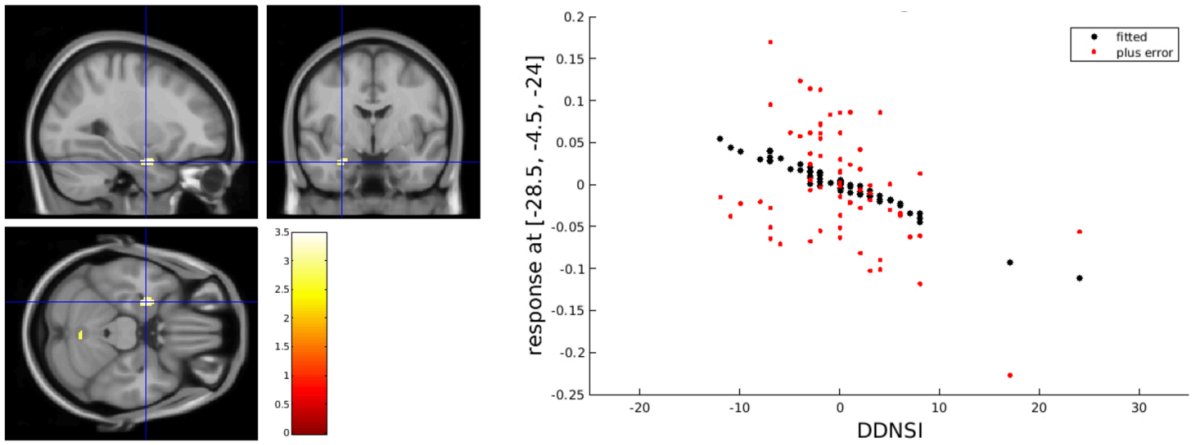


Figure S34. The left amygdala was found to be influenced by BLT in results described earlier. Therefore, we also examined whether the change in the GMV within the left amygdala would correlate with nightmare severity on the Disturbing Dreams and Nightmares Severity Index (DDNSI). We find that greater increase in left amygdala GMV over the course of the study was associated with an increase in nightmare severity (FWE cluster corrected $p = .019$).

Clinician Administered PTSD Scale for DSM-V—Total SYMPTOMS (CAPS-SYMPTOMS). The gold standard metric for assessing the severity of PTSD in a clinical setting is the Clinician Administered PTSD Scale for DSM-V. The scale produces a number of metrics, including the number of symptoms consistent with PTSD and the severity of those symptoms. Here, we examined the correlation between changes in the number of symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS Symptoms scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S35). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

While these findings did not survive the stringent correction for multiple comparisons, there are a number of interesting trends in the data. In particular, it is clear that increased GMV in the primary visual cortex over the course of the study shows prominent associations with increased total symptoms of PTSD. This finding may point toward future hypotheses that address the brain circuitry that may contribute to visual responses or hyperarousal in PTSD.

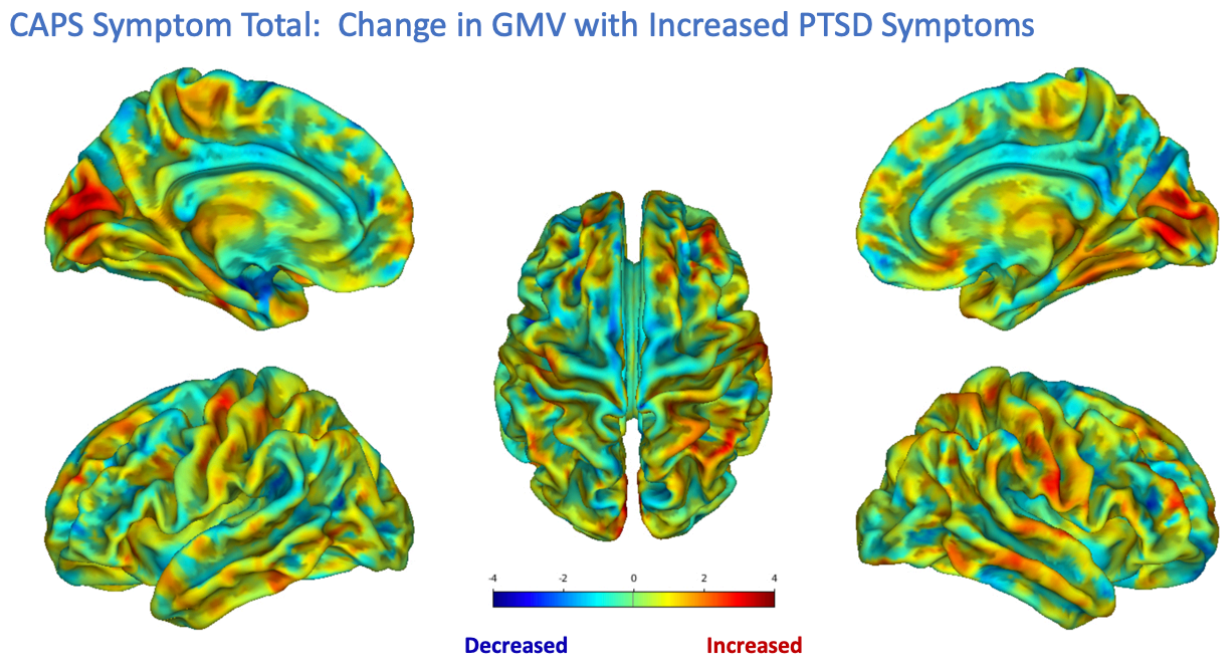


Figure S35 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased symptoms of PTSD on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—Total SEVERITY (CAPS-SEVERITY). A second feature of the Clinician Administered PTSD Scale for DSM-V focuses on the severity of the overall symptoms of PTSD. Thus, we examined the correlation between changes in the severity of symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS Severity scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S36). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

As in prior analyses, these findings did not survive the stringent correction for multiple comparisons. However, similar to the previous analysis of the number of PTSD symptoms, we also find a trend toward increased GMV in the primary visual cortex over the course of the study that is associated with increases severity as well. It is also clear that this association is present for the right somatosensory cortex as well, suggesting that the findings may point toward an increase in sensory perception association with PTSD. This is speculative, but may serve as a potential direction for future research.

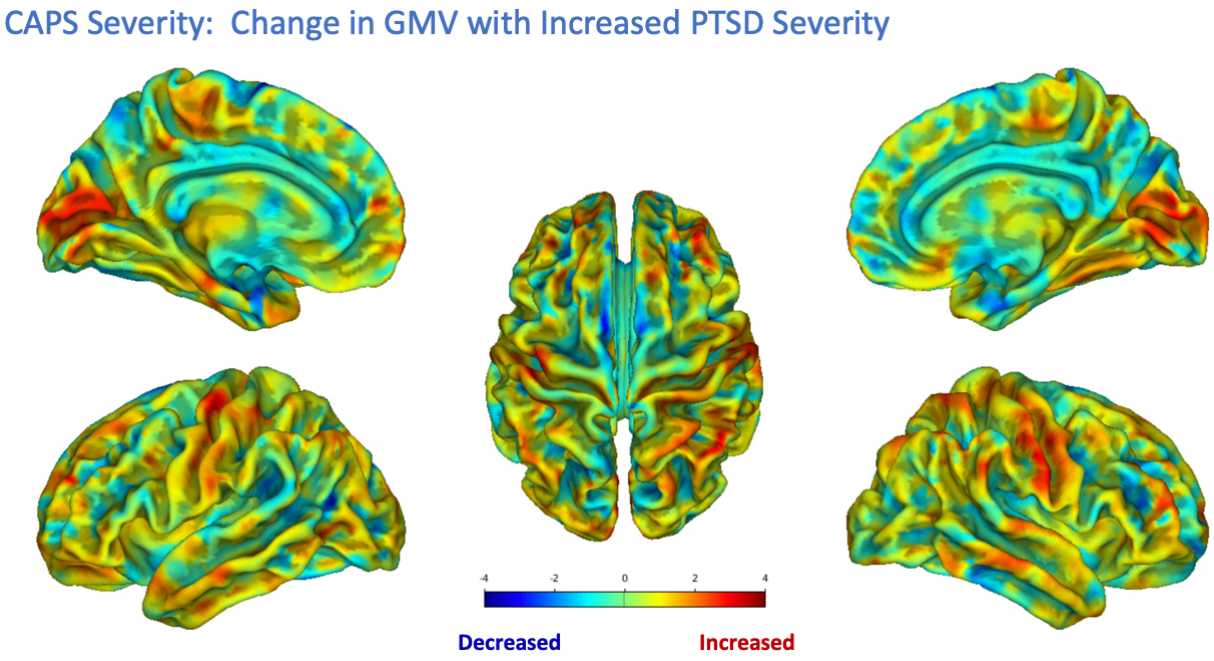


Figure S36 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased SEVERITY of symptoms of PTSD on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD severity were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD severity scores were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—INTRUSION SYMPTOMS (CAPS-INTRUSION SYMPTOMS). The CAPS also provides a number of subscales that identify specific features common to PTSD, including intrusive thoughts, avoidance of places/thoughts/people that remind the individual of the traumatic event, cognitive symptoms, arousal symptoms, distress, and dissociative symptoms. Here, we examined the correlation between changes in the number of INTRUSION symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS INTRUSION SYMPTOM scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S37). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

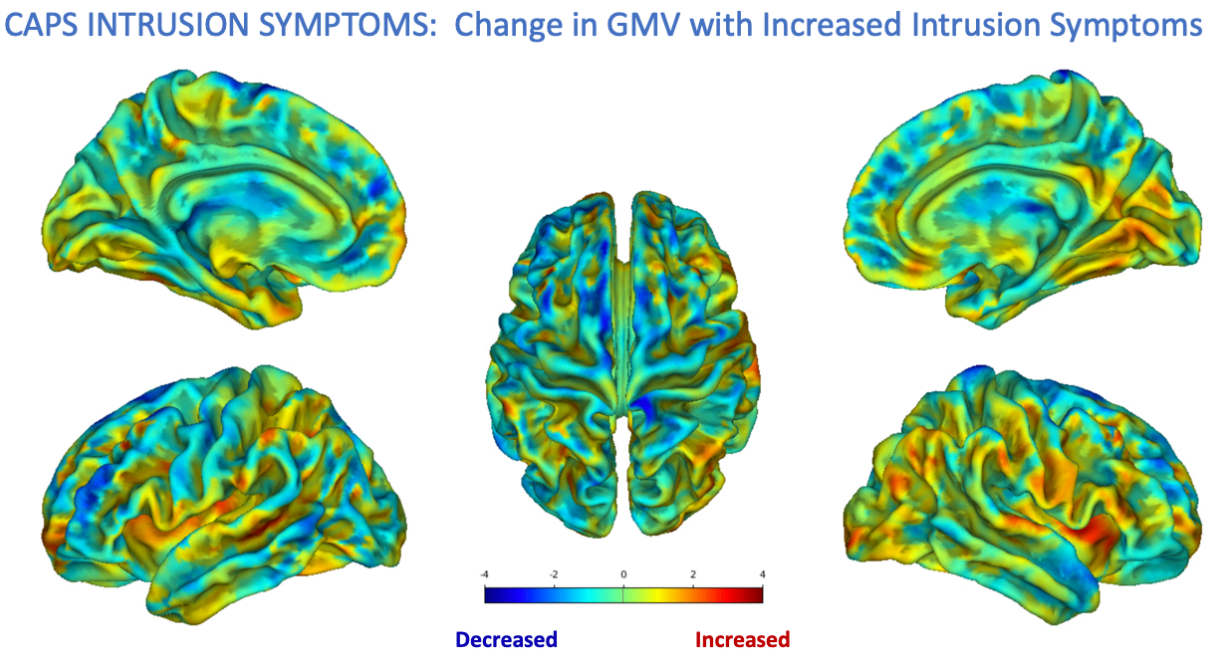


Figure S37 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased number of intrusion symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD intrusion symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD intrusion symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—INTRUSION SEVERITY (CAPS-INTRUSION SEVERITY). Here, we examined the correlation between changes in the severity of INTRUSION symptoms on the CAPS and changes in GMV over the course of the treatment period.

After FDR whole-brain correction for multiple comparisons, there was a significant negative correlation between changes in CAPS INTRUSION SEVERITY scores and changes in GMV within the right cerebellum over the six-week period (FWE corrected at the whole brain level, p = .007, k = 1064). The region of significant correlation is shown in Figure S38). For completeness in reporting, we also present the unthresholded correlation maps for this association (Figure S39). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

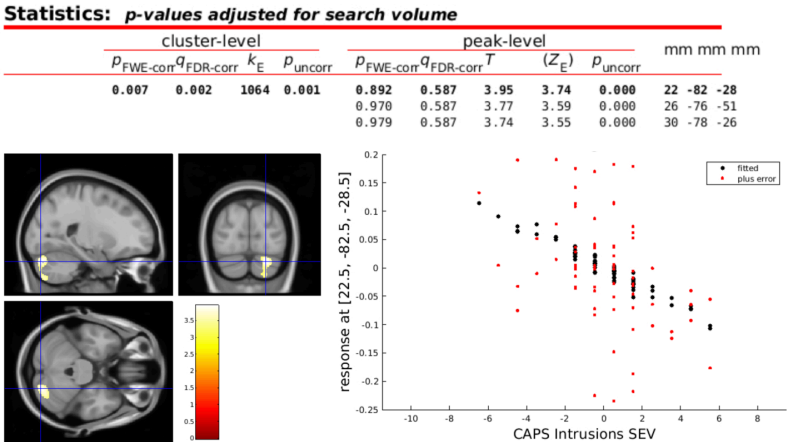


Figure S38. Results of whole brain correlation analysis. The SEVERITY of INTRUSIONS on the CAPS was negatively correlated with gray matter volume in the right cerebellum (FWE whole brain cluster corrected $p = .007$).

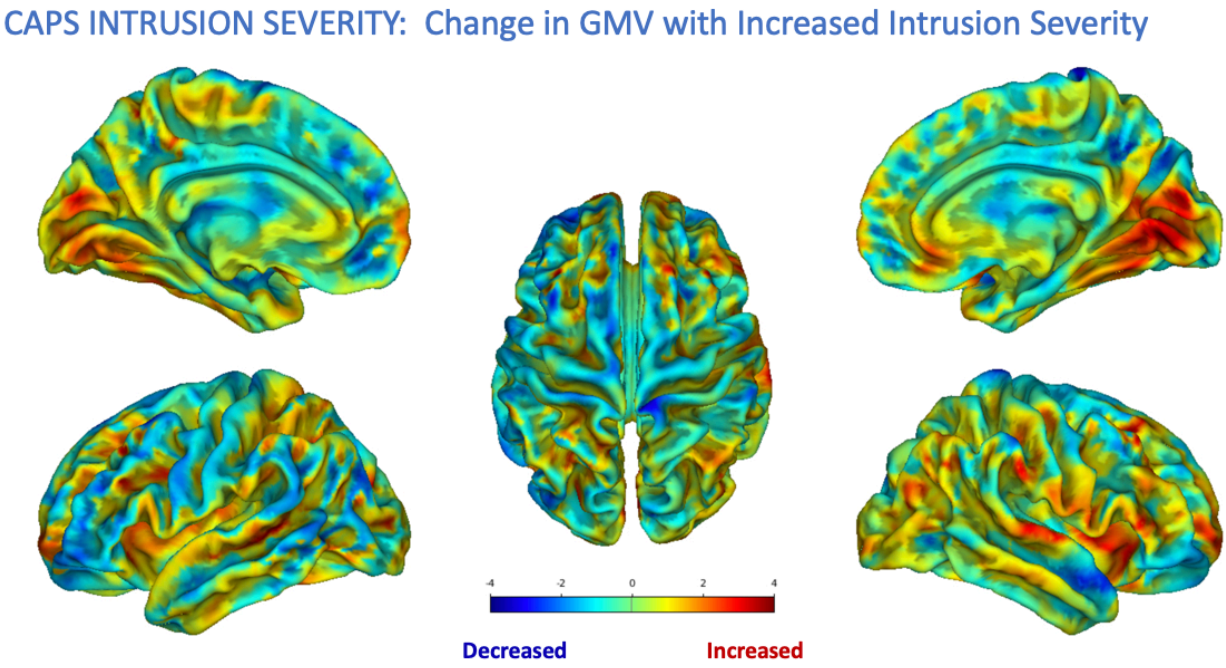


Figure S39 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased severity of intrusion symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD intrusion severity was associated with increased GMV, while cooler colors represent regions where greater increases in PTSD intrusion severity was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—AVOIDANCE SYMPTOMS (CAPS-AVOIDANCE SYMPTOMS). Here, we examined the correlation between changes in the number of AVOIDANCE symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS AVOIDANCE SYMPTOM scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S40). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

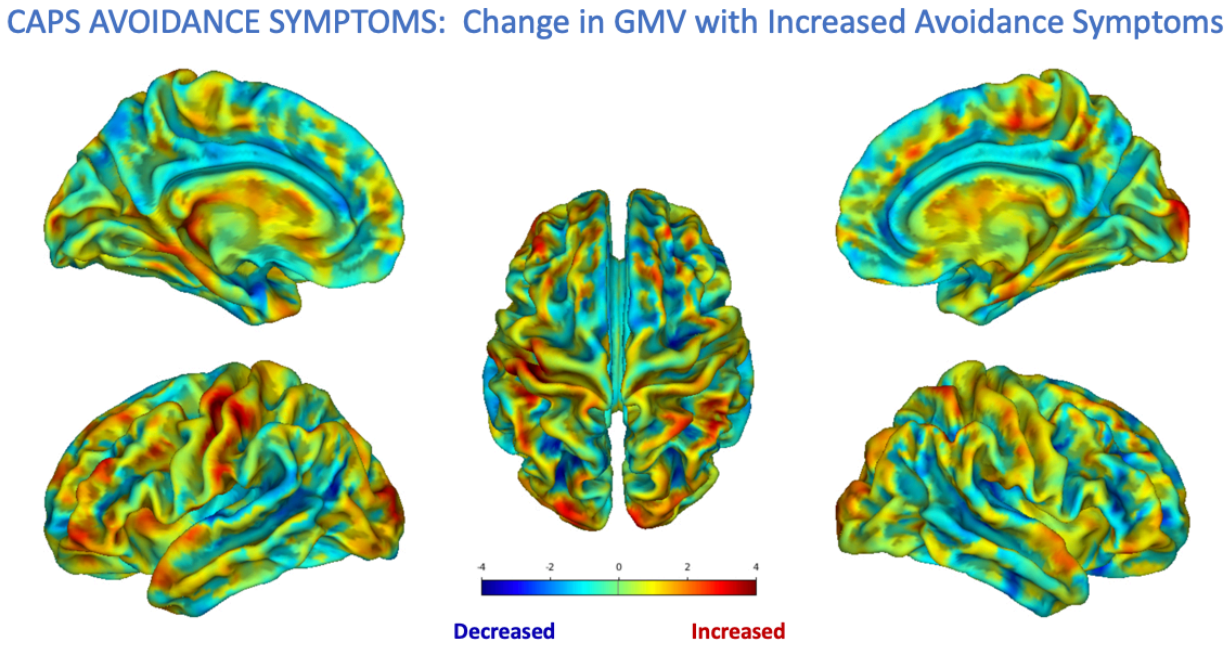


Figure S40 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased number of avoidance symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD avoidance symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD avoidance symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—AVOIDANCE SEVERITY (CAPS-AVOIDANCE SEVERITY). Here, we examined the correlation between changes in the severity of avoidance symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS AVOIDANCE SEVERITY scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S41). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

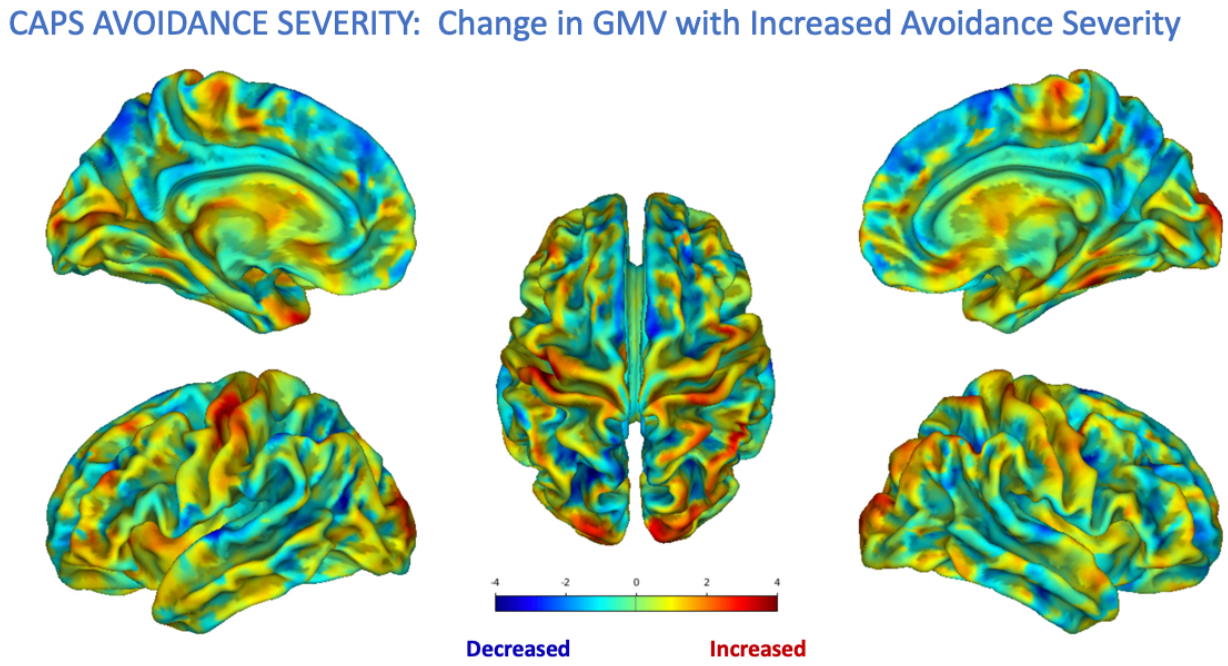


Figure S41 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased severity of avoidance symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD avoidance severity was associated with increased GMV, while cooler colors represent regions where greater increases in PTSD avoidance severity was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—COGNITIVE SYMPTOMS (CAPS-COGNITIVE SYMPTOMS). Here, we examined the correlation between changes in the number of cognitive symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS COGNITIVE SYMPTOM scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S42). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

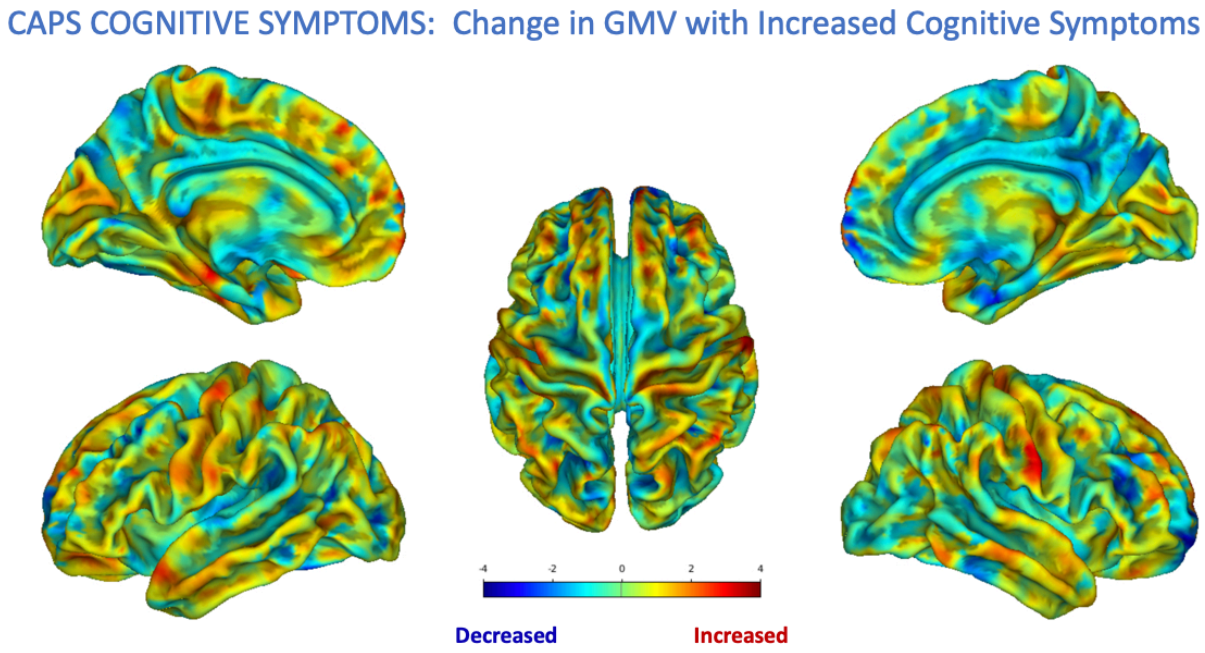


Figure S42 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased number of cognitive symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD cognitive symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD cognitive symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—COGNITIVE SEVERITY (CAPS-COGNITIVE SEVERITY). Here, we examined the correlation between changes in the severity of cognitive symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS COGNITIVE SEVERITY scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S43). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

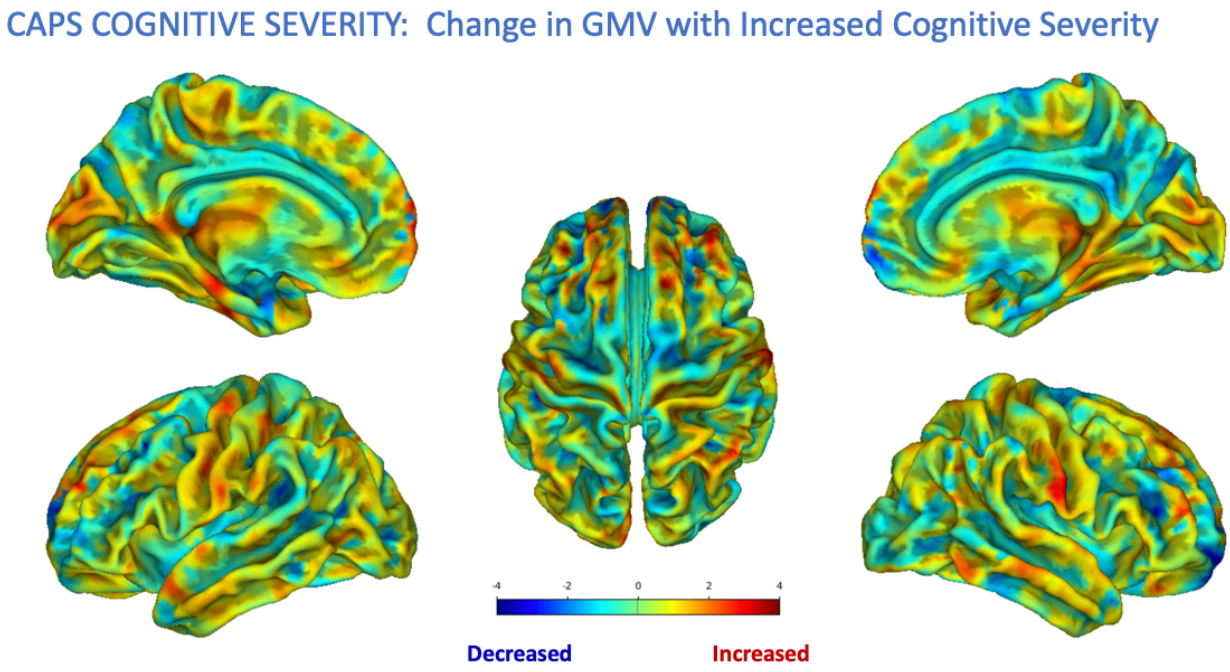


Figure S43 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased SEVERITY of cognitive symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD cognitive symptom severity associated with increased GMV, while cooler colors represent regions where greater increases in PTSD cognitive symptom severity was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—AROUSAL SYMPTOMS (CAPS-AROUSAL SYMPTOMS). Here, we examined the correlation between changes in the number of arousal symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS AROUSAL SYMPTOM scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S44). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

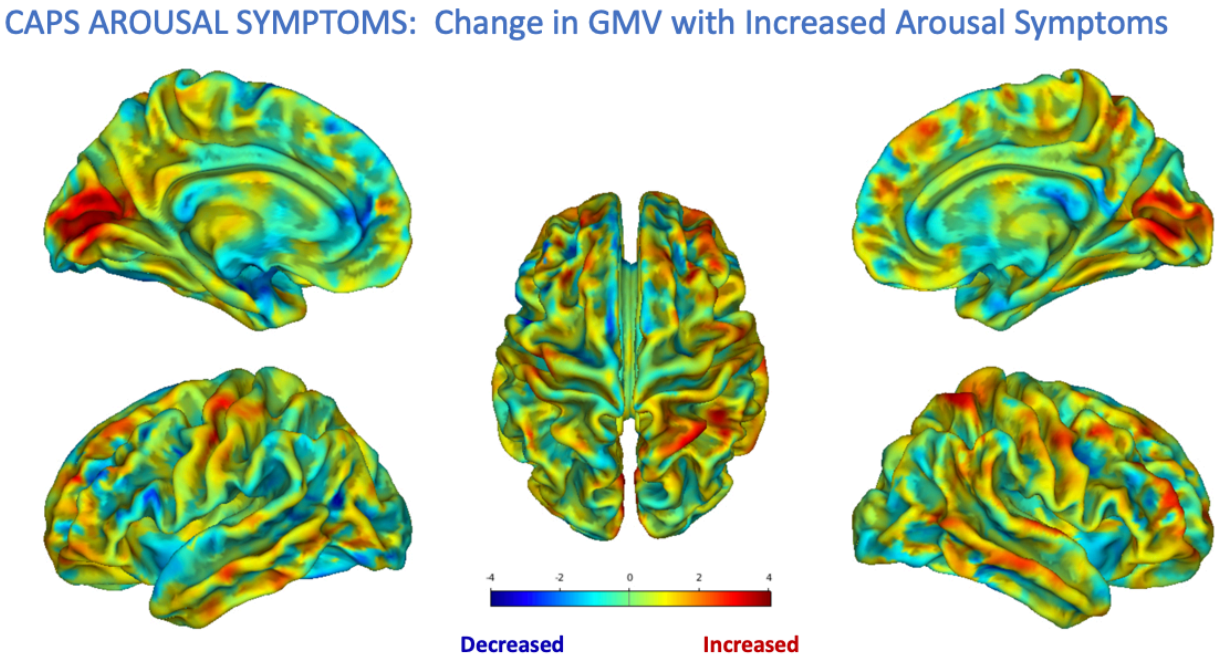


Figure S44 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased number of arousal symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD arousal symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD arousal symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—AROUSAL SEVERITY (CAPS-COGNITIVE SEVERITY). Here, we examined the correlation between changes in the severity of cognitive symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS AROUSAL SEVERITY scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S45). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

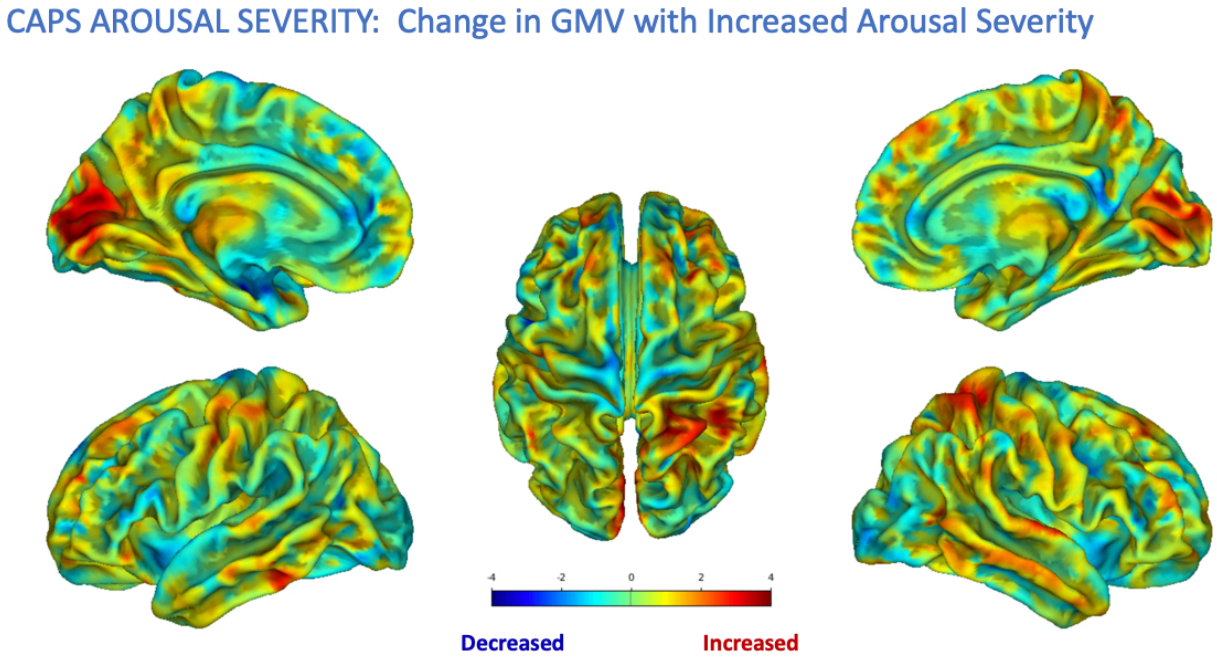


Figure S45 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased SEVERITY of arousal symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD arousal symptom severity associated with increased GMV, while cooler colors represent regions where greater increases in PTSD arousal symptom severity was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—DISTRESS SYMPTOMS (CAPS-DISTRESS SYMPTOMS). Here, we examined the correlation between changes in the number of distress symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS DISTRESS SYMPTOM scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S46). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

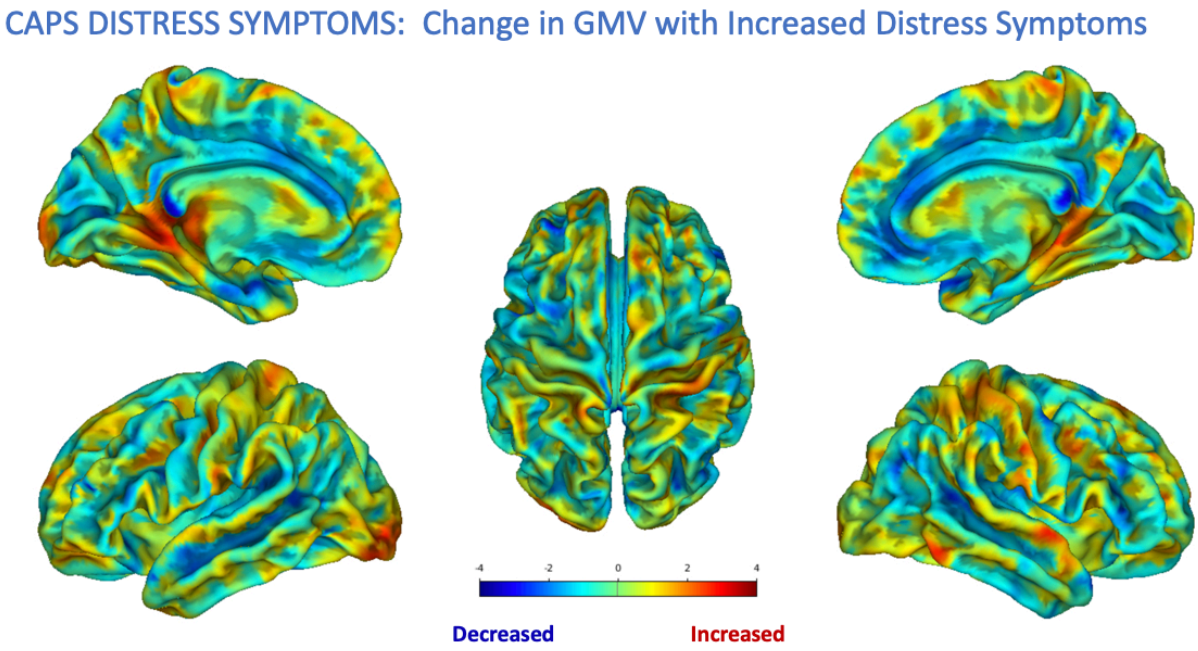


Figure S46 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased number of distress symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD distress symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD distress symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—DISTRESS SEVERITY (CAPS-DISTRESS SEVERITY). Here, we examined the correlation between changes in the severity of distress symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS DISTRESS SEVERITY scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S47). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

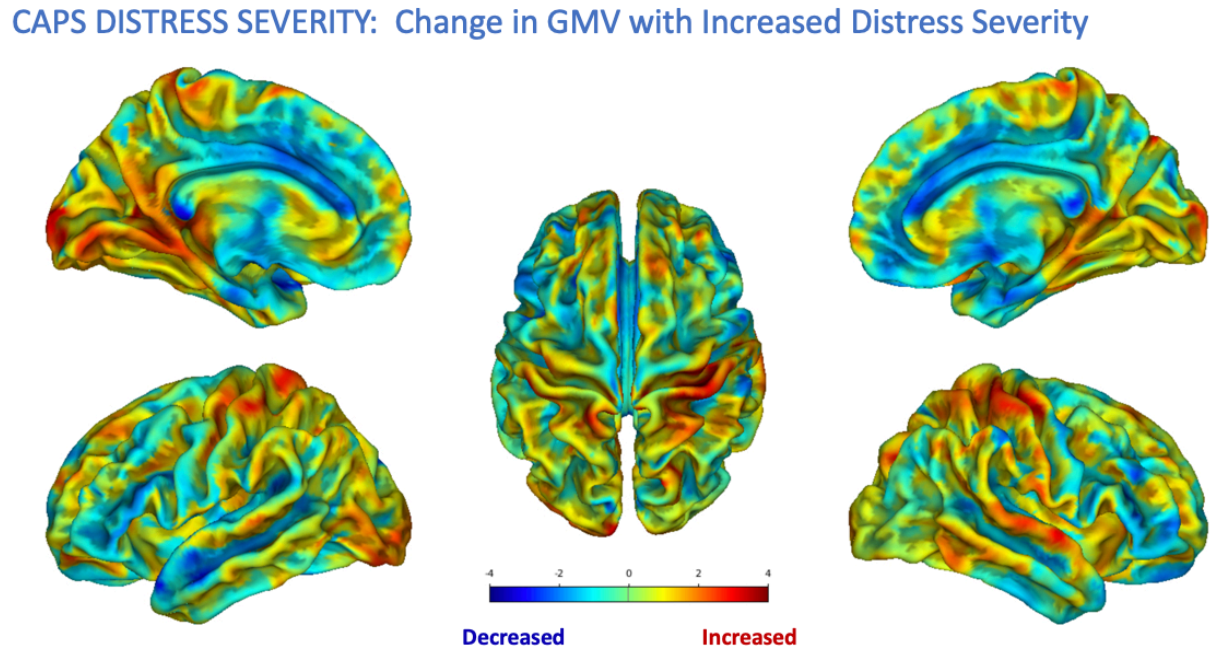


Figure S47 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased SEVERITY of distress symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD distress symptom severity associated with increased GMV, while cooler colors represent regions where greater increases in PTSD distress symptom severity was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—DISTRESS SYMPTOMS (CAPS-DISTRESS SYMPTOMS). Here, we examined the correlation between changes in the number of distress symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS DISTRESS SYMPTOM scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S48). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

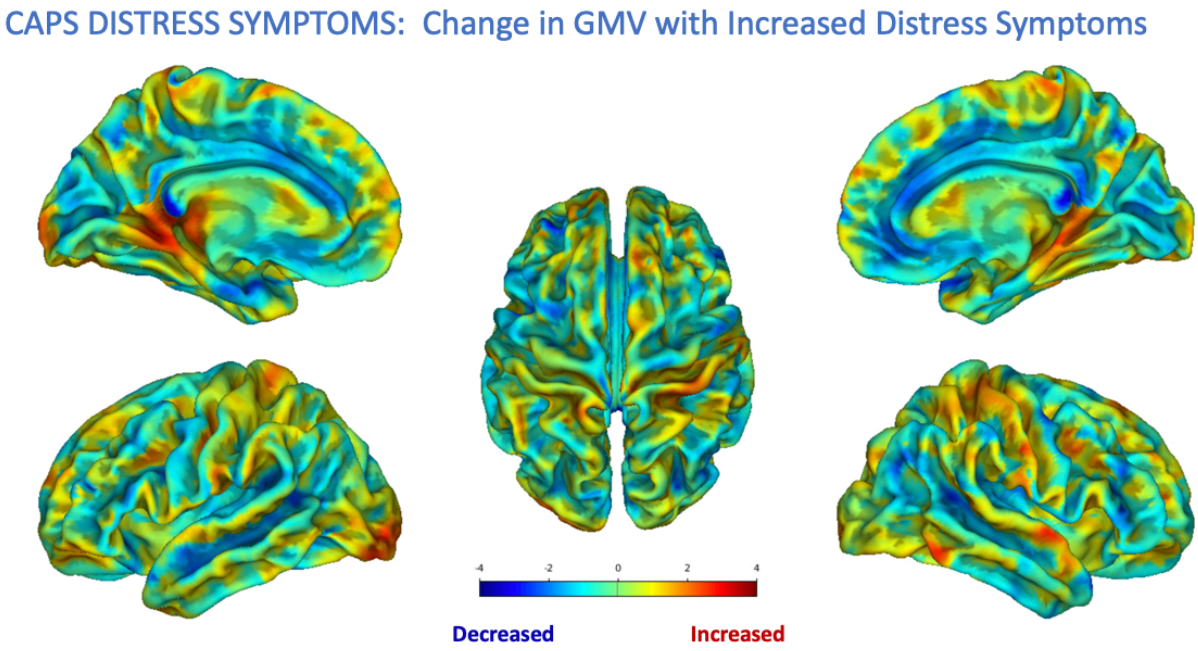


Figure S48 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased number of distress symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD distress symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD distress symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Clinician Administered PTSD Scale for DSM-V—DISSOCIATIVE SYMPTOMS (CAPS-DISSOCIATIVE SYMPTOMS). Here, we examined the correlation between changes in the number of dissociative symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there was only a significant negative correlation between changes in CAPS DISSOCIATIVE SYMPTOM scores and changes in GMV within the left cerebellum over the six-week period. The cluster statistics, spatial locations, and scatterplot are shown in Figure S49. From the plots, it is clear that there was limited variability in the change in the number of dissociative symptoms, so this finding, while statistically significant at a FWE corrected threshold, should still be evaluated with caution. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S50). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

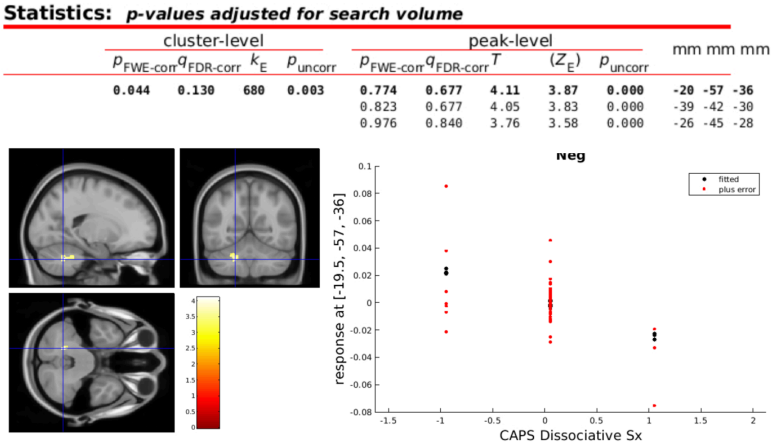


Figure S49. Results of whole brain correlation analysis. The SEVERITY of INTRUSIONS on the CAPS was negatively correlated with gray matter volume in the right cerebellum (FWE whole brain cluster corrected $p = .007$).

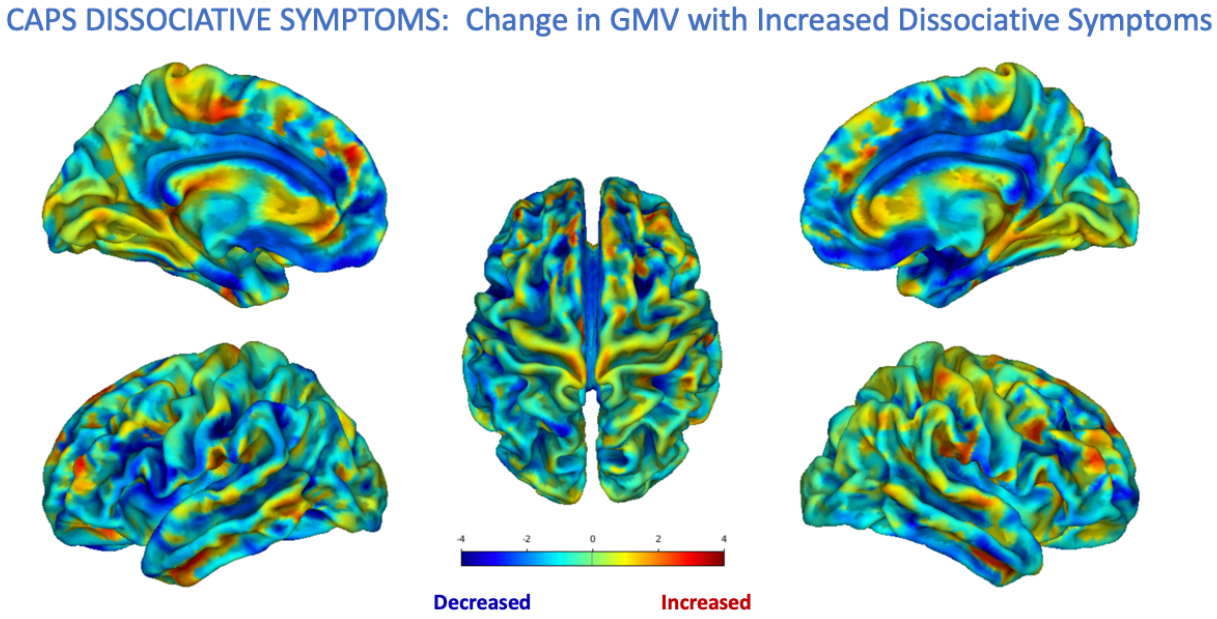


Figure S50 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased number of dissociative symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD dissociative symptoms were associated with increased GMV, while cooler colors represent regions where greater increases in PTSD dissociative symptoms were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance. There was restricted range in the distress changes scores, so these data should be interpreted with caution.

Clinician Administered PTSD Scale for DSM-V—DISSOCIATIVE SEVERITY (CAPS-DISSOCIATIVE SEVERITY). Here, we examined the correlation between changes in the severity of dissociative symptoms on the CAPS and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in CAPS DISSOCIATIVE SEVERITY scores and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S51). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

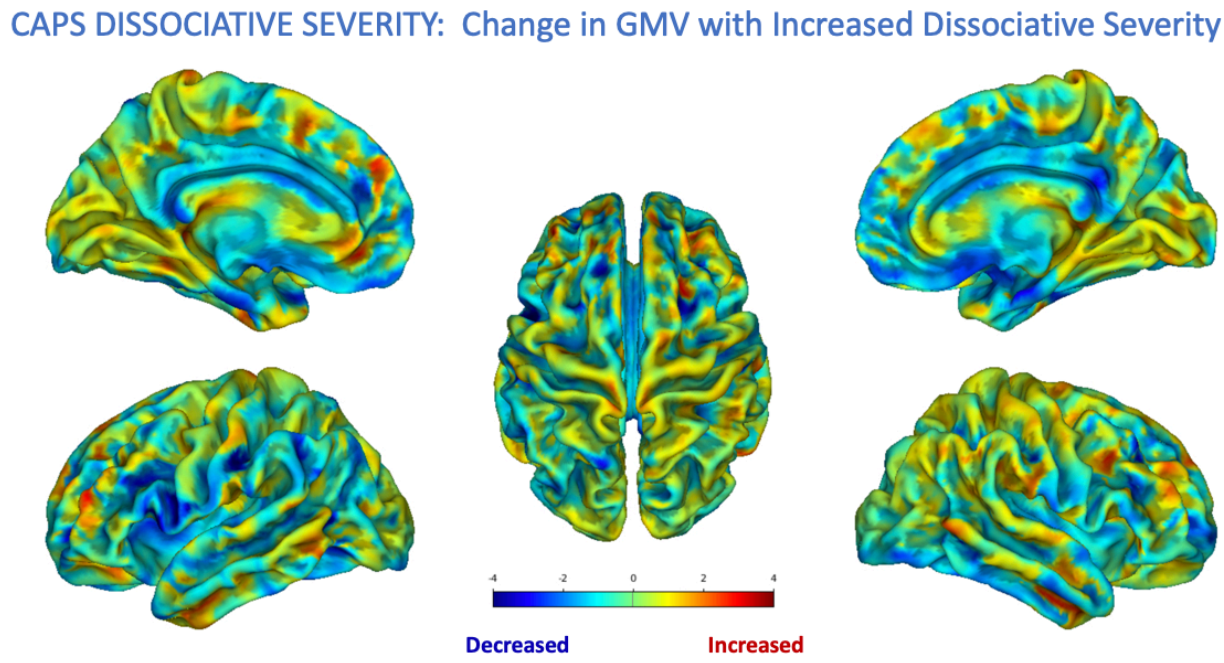


Figure S51 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased SEVERITY of dissociative symptoms on the CAPS over the 6-week period of the study. Warm colors indicate regions where increased PTSD dissociative symptom severity associated with increased GMV, while cooler colors represent regions where greater increases in PTSD dissociative symptom severity was associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

Multiple Sleep Latency Test (MSLT). One goal of the present study was to increase daytime alertness. The MSLT provides an objective measure of electroencephalographic sleep latency during three 20-minute sleep opportunities throughout the day. Therefore, we examined the correlation between changes in sleep onset latency on the MSLT and changes in GMV over the course of the six-week treatment period.

After FDR whole-brain correction for multiple comparisons, there were no significant positive or negative correlations between changes in MSLT sleep latency and changes in GMV over the six-week period. For completeness in reporting, we present the unthresholded correlation maps for this association (Figure S52). The values do not represent clinical significance. Rather, they show the strength of the correlation based on T-maps. The maps are maintained at the same color scaling as the previous maps to facilitate ease of comparisons.

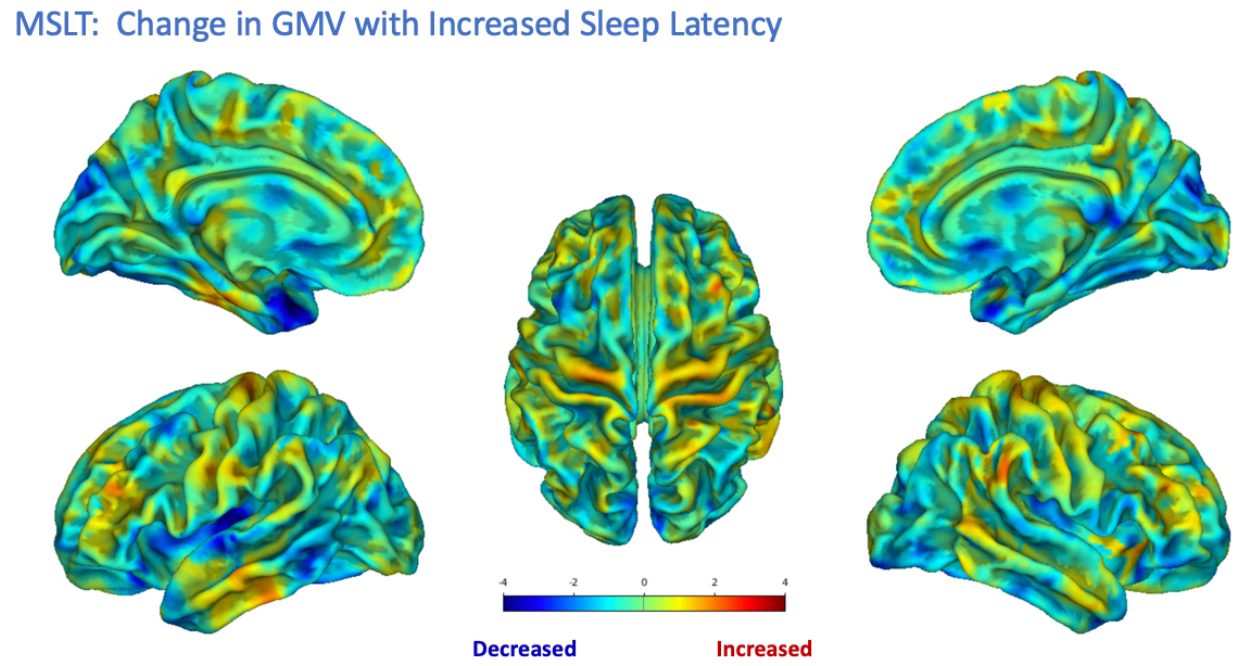


Figure S52 Voxel based morphometry (VBM) colormaps (not statistically thresholded) showing the correlation between change in GMV with increased sleep latency on the MSLT over the 6-week period of the study. Warm colors indicate regions where increased sleep latency was associated with increased GMV, while cooler colors represent regions where greater increases in sleep latency were associated with reduced GMV. The colorbar shows the range of T-values, but does not reflect statistical significance.

- **What opportunities for training and professional development has the project provided?**

Year 1:

One of the Postdoctoral Fellows assigned to the project, Dr. Alkozei, attended a workshop to refine her knowledge pertaining to administration of the Structured Clinical Interview for DSM-V (SCID-5), a required component of the screening process for this project. Subsequent to this, Dr. Alkozei hosted in-lab training sessions for other Postdoctoral Fellows assigned to the project to ensure reliable administration and scoring of this instrument.

In addition, all project staff and personnel underwent comprehensive training in proper triage for individuals who are identified as expressing a propensity for suicide during their participation in the study. Training in this required attendance at two training sessions hosted by the Co-PI, Dr. Haynes. Dr. Haynes met one-on-one with each staff member at the completion of these training sessions to ensure uniform understanding of objectives covered during these trainings.

Lastly, the PI and four of the project's personnel attended the Associated Professional Sleep Societies Meeting held in Seattle, WA in June of 2015 to learn of emergent research of interest to sleep disorders and non-pharmacologic therapies, as they relate to the project.

Year 2:

4 members of our lab attended lectures and presented research findings at the International Neuropsychological Society Meeting, Boston, MA, February 3-6, 2016

3 members of our lab attended lectures and presented research findings at the Society of Biological Psychiatry Meeting, Atlanta, GA, May 12-14, 2016

4 members of our lab attended lectures and presented research findings at the Associated Professional Sleep Societies Meeting, Denver, CO, June 11-15, 2016

1 member of our lab attended lectures and presented research findings at the Military Health Systems Research Symposium, Orlando, FL, August 15-18, 2016.

1 member of our lab attended lectures and presented research findings at the meeting of the Society for Psychophysiological Research, Minneapolis, MN, September 21-25, 2016.

1 member of our lab attended a workshop entitled: Sleep Health Scoring for the Polysomnographer, Scottsdale, AZ, October 13-14, 2016.

1 member of our lab attended a workshop entitled: Actigraphy and Fitness/Sleep trackers in Adults and Children: Fundamentals and applications, at the Associated Professional Sleep Societies Meeting, Denver, CO, June 11-15, 2016

1 postdoc attended the Mind Research Network Functional MRI Training Workshop (January 2016) in Albuquerque, NM.

1 postdoc and 1 graduate student attended the CONN Functional Connectivity Workshop (April 2016), in Boston, MA.

2 postdocs attended the NIH Grant Writing Workshop at the University of Arizona (August 2016), Tucson, AZ.

1 postdoc attended the Applied Workshop on the New SCID-5, Mastering the Diagnostic Interview, University of Michigan.

Year 3:

1 member of our lab attended lectures and presented research findings at the International Neuropsychological Society Meeting, New Orleans, LA, February 1-4, 2017

1 member of our lab attended lectures and presented research findings at the Society of Biological Psychiatry Meeting, San Diego, CA, May 18-20, 2017

3 members of our lab attended lectures and presented research findings at the Associated Professional Sleep Societies Meeting, Boston, MA, June 3-7, 2017

2 members of our lab attended lectures and presented research findings at the Military Health Systems Research Symposium, Orlando, FL, August 26-30, 2017.

1 member of our lab attended lectures and presented research findings at the Organization for Human Brain Mapping, Vancouver, CA, June 25-29, 2017.

1 postdoc attended the FSL Workshop, Vancouver, CA, June 19-23, 2017.

1 postdoc attended the BrainSuite Workshop, Vancouver, CA, June 24, 2017.

1 postdoc attended the Computational Psychiatry Course, University of Zurich, Zurich Switzerland, August 28-September 2, 2017.

1 postdoc attended the Neurometrika SPM Workshop, Philadelphia, PA, July 13-24, 2017.

Multiple members of our lab have attended regular training in MRI analysis methods and safety as part of an ongoing training series offered at the University of Arizona.

Multiple members of our lab receive regular one-on-one instruction and supervision in the administration and scoring of neuropsychological assessments, psychodiagnostic testing, electrode placement, and patient interviewing.

Over 12 members of our lab have undergone regular in-house training in the use of various brain-imaging software, including SPM12, Matlab, FSL, Freesurfer, TracVis, MRIcron and others.

Over 12 members of our lab have undergone basic training modules in ethical conduct, statistical analysis, and neuroanatomy.

Year 4:

We continue to disseminate the findings of our research through publishing abstracts, giving poster presentations at various conferences and hosting military groups at our lab. This year specifically, we hosted and gave presentations to the Human Performance research group at Davis-Monthan and Service Members from Fort Huachuca.

Five presentations were given at international conferences on results found from preliminary analyses of our data.

Year 5

1 member of our lab presented research findings and attended lectures at Annual Biomedical Research Conference for Minority Students, Indianapolis, IN, November 14-17, 2018.

3 members of our lab presented research findings and attended lectures at the SLEEP Conference, San Antonio, TX June 8-22, 2019.

1 member of our lab presented research findings and was selected to attend the Research Symposium at the American Speech-Language Hearing Association, Orlando, FL, November 21-23, 2019.

4 members of our lab presented research findings and attended lectures at International Neuropsychological Society, New York, NY, February 20-23, 2019.

3 members of our lab presented research findings and attended lectures at the Military Health Systems Research Symposium, Kissimmee, FL, August 19-22, 2019.

Multiple members of our lab have attended regular training in MRI analysis methods and safety as part of an ongoing training series offered at the University of Arizona.

All members of our lab receive regular one-on-one instruction and supervision in the administration and scoring of neuro-psychological assessments, psycho-diagnostic testing, electrode placement, and patient interviewing to ensure best data collection practices.

14 college undergraduate students obtained training in research methods during a summer training program in our lab this year, 11 who were sponsored by the University of Arizona and the other by the National Institutes of Health MARC Undergraduate Student Training in Academic Research (U-STAR) Award.

2 undergraduate students were supervised for their Senior Honors Theses in our lab this year.

Over 10 members of our lab have undergone regular in-house training in the use of various brain-imaging software, including SPM12, Matlab, FSL, Freesurfer, TracVis, and MRIcron.

Year 6

Our team members were supported in their professional development goals during their involvement with the project.

Lab members received regular training and supervision on the administration, scoring and interpretation of neuropsychological assessments, the application of electrodes for EEGs, the analysis of sleep waves for Multiple Sleep Latency Tests (MSLTs) as well as the administration of psycho-diagnostic assessments

and phone screening for PTSD. Lab members are encouraged to explore data that align with their interests. They are supported in creating and submitting abstracts.

6 members of our lab presented research findings at the remote SLEEP conference June 14-16, 2020.

9 members of our lab presented research findings and attended lectures at International Neuropsychological Society, Denver, CO, February 6-8, 2020.

Multiple members of our lab have attended regular training in MRI analysis methods and safety as part of an ongoing training series offered at the University of Arizona.

All members of our lab receive regular one-on-one instruction and supervision in the administration and scoring of neuro-psychological assessments, psycho-diagnostic testing, electrode placement, and patient interviewing to ensure best data collection practices.

21 college undergraduate students obtained training in research methods during a summer training program in our lab this year, 19 of whom were sponsored by the University of Arizona, 1 by the National Institutes of Health MARC Undergraduate Student Training in Academic Research (U-STAR) Award and 1 by the Undergraduate Biology Research Project (UBRP).

5 undergraduate students were supervised for their Senior Honors Theses in our lab this year.

1 Doctoral student is using the current project data as the basis of his Doctoral Dissertation.

Over 7 members of our lab have undergone regular in-house training in the use of various brain-imaging software, including SPM12, Matlab, FSL, Freesurfer, TracVis, and MRIcron.

Year 7:

4 undergraduate college students and several full-time staff members received training in scoring actigraphy data and cleaning skin conductance, PVT, HRV, and BART data. Undergraduates and the study coordinator worked closely to double enter, double-score, and clean questionnaire data using REDCap software. Undergraduates were supported in writing and submitting abstracts to conferences.

- **How were the results disseminated to communities of interest?**
  For the duration of the study, the findings of our research were disseminated through published abstracts, poster and oral presentations at various conferences, published articles in the peer reviewed literature, and by hosting military groups at our lab. See below for a summary of each year's dissemination of findings:

  Year 1:

  Nothing to report. At the end of Year 1, the project was still too early in its course to allow analysis and reporting of data.

  Year 2:

  During Year 2, the study team gave two presentations to the Tucson Veteran's Center regarding the PTSD study. Our staff also conducted several short presentations to the medical residents at the University of Arizona Medical Center.

Year 3:

During PTSD Awareness Month, Dr. Killgore was interviewed by Tucson News Channel 4 to bring attention to the limited treatment options for PTSD and the novelty of our project. Our lab hosted visiting groups from the Military Intelligence community at Fort Huachuca on three occasions in Year 3. During these tours, the PTSD team gave presentations on our study to Service Members to educate them on our ongoing projects related to PTSD and other military-relevant research. In Year 3 we developed a partnership with Tucson's Kino Veteran Workforce Center and presented our study to Veterans on a quarterly occurrence. Our staff also manned study information booths at community events such as the Veterans and First Responders 5k and at University of Arizona campus events.

Our team members attended the following conferences in Year 3:

1. 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.
2. SLEEP Meeting, Boston, MA, June 3-7, 2017.

Year 4:

In Year 4, our study team hosted and gave presentations to the Human Performance research group at Davis-Monthan and to Servicemembers from Fort Huachuca.

Our team members attended the following conferences in Year 4:

1. International Neuroscience Society (February 2018) in Washington, D.C.
2. Society for Biological Psychiatry (May 2018) New York City, NY
3. American Academy of Sleep Medicine and the Sleep Research Society (June 2018) in Baltimore, MD

Year 5:

Our team members attended the following conferences in Year 5:

4. American Speech-Language Hearing Association (November 2018)
5. International Neuropsychological Society (February 2019) in New York City, NY
6. Military Health System Research Symposium (August 2019) in Kissimmee, FL
7. SLEEP Conference (June 2019) in San Antonio, TX
8. Annual Biomedical Research Conference for Minority Students (November 2018), Indianapolis, IN.

Year 6:

Our team members attended the following conferences in Year 6:

1. International Neuropsychological Society (February 5-8 2020) in Denver, CO.
2. SLEEP (June 2020; remote conference).

Additionally, Dr. Killgore presented some preliminary sleep-related findings from the lab at the DoD Sleep Workshop (February 5-6, 2020) in Arlington, VA.

We also hosted the Chief Master Sergeant, CMSgt Lyda, from the Command Chief for the 355th Wing at Davis-Monthan Air Force Base, and several members of his team during a tour of our lab facilities. This allowed us to demonstrate our lab capabilities and preliminary findings to the local military community.

Year 7:

Our team members virtually attended the following conferences in Year 7:

1. International Neuroscience Society (June 30-July 3, 2021; remote conference)
2. Sleep Conference (June 10-13, 2021; remote conference)

- **What do you plan to do during the next reporting period to accomplish the goals?**

Nothing to report.

4. IMPACT:

- **What was the impact on the development of the principal discipline(s) of the project?**

We have presented preliminary findings at scientific and military conferences. These findings have advanced our understanding of the effects of blue light therapy as a treatment for PTSD and demonstrated effects on various outcomes, including mood, well-being, anxiety, and how these relate to changes in brain organization and activity following 6-weeks of blue light therapy. Thus, the field of trauma related research and intervention, in and out of the military, have been advanced by the preliminary findings disseminated thus far.

- **What was the impact on other disciplines?**

Preliminary findings have been mainly presented to focused audiences, however, findings elucidated in this report will likely have wide reaching impact in areas related to fear based learning and clinical interventions that reach beyond the primary discipline of neuropsychology.

- **What was the impact on technology transfer?**

Nothing to report.

- **What was the impact on society beyond science and technology?**

Our team has given tabletop presentations in the local community to expand awareness of the utility of blue light therapy for mTBI, as well as described the efficacy indicated by our preliminary findings. This has helped to communicate the effectiveness of sleep-based treatments as they apply to trauma and anxiety disorders.

5. CHANGES/PROBLEMS

- **Changes in approach and reasons for change:**

COVID-19:

The global COVID-19 pandemic created significant disruptions to data collection activities, and ultimately resulted in the early conclusion of our recruitment efforts. Two participants who were active at the start of the pandemic completed their final visits remotely, and therefore no post-treatment neuroimaging or physiological data were collected for these two participants. Two other participants were found eligible and enrolled in the study just prior to the COVID-19 outbreak, but were dismissed from the study after we received guidance from our science officer, Ms. Inna

Williams, to close the study to recruitment. Neither participant had started the intervention at the time of their dismissal.

See below for a list of amendments:

Amendment 1: updating F200 language clarifying study aims, compensation, adding ISI to screening, updating exclusion criteria, removing GAT scale, adding language to describe compliance monitoring and data collection. Added Andrew Fridman, Johnny Vanuk, Sarah Markowski and Derek Pisner to list of personnel.
IRB approval date: July 25, 2014

Amendment 2: modification of key personnel (added Anna Alkozei and Bradley Shane).
IRB approval date: August 4, 2014

Amendment 3: added the Actiwatch Responsibility Form, Actiwatch User Guide, standard drink info sheet, subject payment form, and watch & light subject guide to participant materials; updated Informed Consent Form; added BAI, BDI-II, CD-RISC, CES, COPE Inventory, EHS, EVAR, FOSQ, MEQ, PCL-M, SCID, STAI, and WASI2 to assessments; added Screen Time, Sleep Diary, and sleep diary reminder email to data collection tools; added Haley Kent to list of personnel; updated F200 language to clarify subject compensation, procedures, recruitment methods and consenting process, exclusion criteria, and privacy and confidentiality provisions; and added a flyer, phone script, and radio ad to recruitment materials.
IRB approved date: October 14, 2014

Amendment 4: edited BART; added MRI Metal checklist and PVT; added Kerry Mendes to personnel list; updated F200 language to clarify procedures, risks, and privacy and confidentiality provisions; edited F213 to add PVT; updated Informed Consent Form; added NHLBI certificate of confidentiality; added SCAN Lab psychiatry website landing page; and edited phone script for sentence structure.
IRB approved date: November 20, 2014

Amendment 5: added Sara Knight to personnel list; edited the Informed Consent Form to remove reference to radiologist review of scans; updated F200 language to clarify recruitment information, add social media, remove language referencing radiologist review of scans, and remove reference to medical assessments from benefits section.
IRB approved date: December 16, 2014

Amendment 6: added Ryan Smith, Megan Kotzin, Samantha Roberts, Debby Waugaman, Kaylie Sanchez, Anmol Singh, and Taylor Clark to personnel list.
IRB approved date: March 3, 2015

Amendment 7: added Ectopic heartbeat script; updated F200 to add to potential benefits, monitoring for subject safety, and withdrawal of subjects; and edited Informed Consent Form to add PI discretion for subject removal and informing participant of ectopic heartbeat is applicable.
IRB approved date: April 15, 2015

Amendment 8: replaced/updated SCID-5 battery, Sleep diaries A&B, PCL-5, Actiwatch Spectrum Pro instructions, BDI-II, RBANS A&B, subject payment form, and STAI; Added Stoll, Klimova, Singh, McIntosh, Bao, Smith, Nettles, Pond, and Baker to personnel list and removed Gartner, Kent, Mendes, Sanchez, Clark, and Shane; updated Smith, Kotzin, Roberts, Waugaman, and Singh roles; added WRAT4, PTSD Shock Expectation Questionnaire, light equipment responsibility agreement,

informed consent script, DSIQ basline visit & DSIQ Post-Tx visit, DDNSI, CAPS-S, BL PTSD Compensation schedule schematic, RPCSQ, MUSE, Marijuana use calendar example, instructions for using light device, AUDIT, UA traumatic flyers A & B, PVT computer task, CES, anticipation task, traumatic stress flyers A&B, and Watts Meter Manual; updated Informed consent form to reflect changes and for clarity/accuracy of language; updated F200 to include all added/replaced assessments, include non-military for broader study reach, update accurate compensation, update alternate contact, updated inclusion/exclusion criteria, and update recruitment methods.
IRB approved date: July 27, 2015

Amendment 9: added Matt Allbright, Melissa Millan, and William Palmer to personnel list (edited F107 to reflect changes and submitted F109).
IRB approved date: December 23, 2015

Amendment (reportable?) 10: edited F200 and Informed consent form to include language referencing potential subject anxiety during MRI scans.
IRB approved date: January 22, 2016

Amendment 11: added Nick Deak, Kylin Fraser, Katelyn Kennon, Layne Compton, Monica Haro, Erin Howard, and Rouna Mohran to personnel list; added Sleep diaries A&B and follow-up phone screen; updated F200 to reflect added materials.
IRB approved date: March 7, 2016

Amendment 12: updated informed consent form to match F200 changes in previous amendment.
IRB approved date: March 24, 2016

Amendment 13: updated informed consent form to tell subjects they will not have access to study data until after completion.
IRB approved date: May 18, 2016

Amendment 14: edited F200 to update age range to 18-50 yrs and PTSD acquisition timeframe; edited ICF to update age range, clarify sleep assessments and pregnancy test language, update scanning time, add clarifying language to diary and overall, and update compensation; and made the following changes to personnel list: added Alyssa Dormer, Simone Hyman, Sky Challener, Jacqueline Marquez, Anna Sanova, Mareen Weber, Sara Lomayesva, Brad Shane, Jenna Franco, and Amaris Castellanos, removed Kotzin, Roberts, Stoll, Klimova, Bao, Pond, Baker, Kennon, Compton, Haro, and Howard.
IRB approved date: July 25, 2016

Amendment (reportable) 15: added Dr. Grandner to personnel list following planned deviation and updated F200 to allow for Dr. Grandner or non-IRB approved clinician to provide suicidality assessment if necessary.
IRB approved date: September 21, 2016

Amendment 16: added SWLS, trauma history screen, Sun Link ad, and PTSD flyer; updated F200 to reflect added materials; updated phone screen for clarification and to add necessary screening questions; added Sahil Bajaj, Melissa Gottschlich, Pari Patel, Katie Gies, and Bryan Clines to personnel list and removed Haynes.
IRB approved date: December 15, 2016

Amendment 17: added PTSD VA flyer; edited ICF to add brief presentation of graphic images; made following changes to personnel list (F107): updated Haynes CITI training, removed Psiner, Singh,

McIntosh, Palmer, Fraser, Mohran, Lomayesva, Franco, Castellanos, and added Vaughn, Baker, Ryan, Rodriguez, Long, Lee, Mora, and McVeigh; edited study interest form by removing AZ Daily Star, Craigslist, SunTran, UMC TV Monitors and adding Flyer, Greek life, and Southern Arizona VA Healthcare System.
IRB approved date: February 28, 2017

Amendment 18: added Angela Yung and removed Brad Shane and Joseph Yee from personnel list.
IRB approved date: May 5, 2017

Amendment 19: added new recruitment article and added Trevor Grant and Janice Hayhoe to personnel list.
IRB approved date: May 16, 2017

Amendment 20: added Matthew Thurston to personnel list.
IRB approved date: June 2, 2017

Amendment 21: edited F200 to add risk of subject discovering brain abnormalities revealed during study and to make minor typographical/clerical changes, and added script for informing subjects of brain abnormalities if applicable.
IRB approved date: August 24, 2017

Amendment 22: edited F200 to update alternate contact info, expand recruitment area beyond Tucson, add post-screening surveys, remove outdated materials, and make minor typographical and clerical corrections; revised consent form to correct pagination and edit accrual estimate; add new pre-screening survey for Amazon Mechanical Turk; and edited F107 personnel list to add Natalie Dailey, Brittany Forbeck, Michael Lazar, Meltem Ozcan, Adam Raikes, Brieann Satterfield, and Jeff Skalamera and remove Nick Deak, Alyssa Dormer, Katie Gies, Andrew Fridman, Simone Hyman, Emily Long, Gaby Mora, Pari Patel, Marisela Rodriguez, CJ Ryan, Tristen Vaughn, and Mareen Weber.
IRB approved date: September 1, 2017

Amendment 23: updated personnel list to reflect addition of Manuel Acuna, Renata Botello, Garrett Hisler, Kyle LaFollette, Michael Miller, Kristin Shepard, and Sydney Wilkerson and removal of Sarah Berryhill, Simon Esbit, Melissa Gottschilch, Trevor Grant, Janice Hayhoe, Jacqueline Marquez, Katelyn McVeigh, Melissa Millan, Matthew Nettles, and Courtney Smith; removed recruitment flyer PTSD_Flyer.pdf and replaced with slightly reworded, reformatted, and clearer version.
IRB approved date: March 7, 2018

Amendment 24: edited F200 to update contact info page, clarify recruitment resources, include UA emergency Department's Research Associates Program (RAP) and staff as recruitment method, add pre-screening of electronic medical record (EMR) for recruitment purposes, clarified that signed copies of ICF will be provided to subjects, update provisions to protect confidentiality to include information relevant to pre-screening of EMR, and revise compensation plan to remove potentially punitive phrasing; edited ICF to clarify that copies of the signed ICF will be provided to subjects; edited list of personnel to remove Garret Baker, Skye Challener, Garrett Hisler, Sara Knight, and Angela Yung; abd added: 1. Appendix for Waiver/Alteration of PHI 2. Permission to Contact Form 3. Electronic Medical Record Recruitment Letter (BLPTSD_EMR_letter.doc) 4. RAP Referral Instructions.
IRB approved date: May 24, 2018

Amendment 25: edited F200 to update personnel qualifications for administering and add collection of eye color data at follow-up and broadened follow-up period; edited ICF to add additional disclosure about discussions of emotionally difficult topics, revise time frame for follow-up phone call; edited Consenting Script to update wording for clarity, edit the payment schedule, and add a disclosure about psychological discomfort associated with clinical interview; edited Phone Screening Script to add a disclosure about psychological discomfort associated with clinical interview, additional study specifics to better inform subjects of the study, additional information and clarification to make screening process easier for potential participants, and additional information and instruction to improve staff screening of subjects; edited DSIQ to add question about eye color; added Treatment Perception Questionnaire; and edited Personnel list to remove Manuel Acuna, Renata Botello, Anna Sanova, Ryan S. Smith, Matthew Thurston, Anmol Singh, Jun Lee, Maddie Martinez, Debby Waugaman, Sydney Wilkerson, Jess Mann, and Victoria Sarinana, add Anna Burns, and Emily Taylor, update CITI Dates for Johnny Vanuk, Anna Alkozei, and Theodore Trouard, Ph.D., and revise Research Role of Johnny Vanuk.
IRB approved date: March 12, 2019

Amendment 26: edited F200 for formatting and administrative changes throughout, to clarify and update inclusion criteria (Clarify hand dominance, remove menstrual cycle criteria, remove traumatic experience requirements for non-military personnel) and exclusion criteria (Specify exclusionary loss of consciousness >30 minutes and amnesia >24 hours, clarify that exclusionary conditions are chronic and may also be psychiatric in nature, and provide examples, remove marijuana use and alcohol abuse, only exclude drug dependence/abuse within past 12 months, change eligible IQ from 80 to 70, add ongoing trauma and non-qualifying types of trauma, remove return from deployment >36 months, provide additional examples of restricted medications); to correct location where recruitment ads will be placed or shown (CoM and UAHS, not Banner monitors/ screens or clinics), clarify that Hospital monitors/screens, the UA Research Associates Program (RAP), and pre-screening of medical records have not been implemented and will not be used as recruitment resources, allow staff who are appropriately trained to administer SCID, remove information about including non-military personnel, remove randomization matching based on age and time since injury, and remove duplicated eligibility criteria; and removed Appendix for Alteration/Waiver of Consent/PHI BLPTSD_Permission_to_contact.doc and the PAI scale.
IRB approved date: May 2, 2019

Amendment (reportable) 27: reported changes made to Actiwatch Spectrum Pro Instructions without prior IRB approval (wording changes, inclusion of tips section, and added image), and non IRB-approved materials/correspondence provided to subjects (Map & Visit Summary Emails and Texts to Potential Participants script, sending Emails script, Reminder Emails script, Leaving a Voicemail script, and Sleep Diary Instructions).
IRB approved date: June 13, 2019

Amendment 28: edited F200 to clarify max accrual (108) and remove memory suppression task (MST) and MSIT; edited ICF to remove redundant estimated maximum accrual, correct max number of participants, add post-study follow-up phone call script, rephrase throughout, and add more detailed description in phone screen form ("currently" changed to "past month," and asking for quantity of symptoms in past month); added ICF addendum; and updated personnel list to remove Meltem Ozcan and update CITI date for Michael Grandner.
IRB approved date: August 6, 2019

Amendment 29: submitted to clarify use of MEGA-PRESS spectroscopy sequence in MRI protocol and provide an appendix for devices (MEGA-PRESS MEGA-PRESS WIP sequence manual MEGA-PRESS risk rationale); edited F200 for clarity, to make typographical/clerical corrections and

changes, relocation of some information for formatting, to clarify location of scanner, add info about MEGA-PRESS, to remove BL PTSD_MTurk_pre-screen.pdf, to clarify use of psychotropic medications, to define CDMRP, to specify that screening data will not be used in data analysis, to clarify when a trained psychologist will review SCID, to specify that recordings may be transcribed onto the RBANS form, to add more info about the light devices used, to add more info about follow-up survey, to add risk info (non- standard MRI, approved hardware, light device, & actiwatch), to add info about REDCap/data security, to align compensation language pertaining to MRI, to specify data use for withdrawals; edits ICF to clarify details of follow-up and disclose other reasons for & specify data use after withdrawal from study; and added CDMRP requirements and safety analyses: goLITE BLU & yellow goLITE yellow goLITE spectral analysis.
IRB approved date: October 10, 2019

Amendment 30: edited F200 to remove memory suppression task, move day of scan questionnaire (DSIQ) and health questionnaire from visit 1 to visit 2, remove CES from visits 2 and 3, replace images in Fear Conditioning task, correct figure numbering, specify documents used for recruitment into/ consent for follow-up and that follow-up is voluntary, remove CoC ICF and CoC ICF addendum, add option to email follow-up assessments, and remove signature lines and replace with check boxes for consent indication; modified parking instructions and directions to lab; edited visit reminder emails to reflect parking/direction changes; updated Actiwatch user guide to include instructions for subjects regarding low actiwatch battery; edited PTSD Flyer to clarify eligibility; edited radio ad to clarify age requirements, update study phone number, and shorten IRB review statement; added Appendix: Waiver of Documentation of Consent Follow-up script and Underwriting script; and edited personnel list to add Manuel Acuna and Ayla Bullock and remove Sahil Bajaj, Simon Esbit, Michael Lazar, and Jeff Skalamera.
IRB approved date: December 18, 2019

Amendment (reportable) 31: submitted to announce cancelled visits and postponement due to COVID-19.
IRB approved date: March 30, 2020

Amendment 32: submitted to announce that for foreseeable future due to COVID-19 and social distancing/spread mitigation efforts, all current subjects will not complete onsite MRI scans but will complete all other planned study assessments (MUSE, BAI, BDI-2, EVAR, STAI, DSIQ, Therapy Questionnaire, SWLS, CD-RISC, PCL-5, ISI, PSQI, PHQ-9, DDNSI, FOSQ, GQ-6, Treatment Perception Questionnaire) online; revised ICF to include info about FDA risk level guidance, specific risks for certain metallic objects in their bodies, metal objects brought near the scanner, and noise, and update disclosure about incidental findings; edited F200 and IRB application to add MRI research umbrella project, remove hypothyroidism medication and calcium channel blockers from exclusion criteria, remove requirement to have begun speaking English by age 4, add additional info about MRI procedures and risks (including possible use of investigational MRI procedures or equipment under umbrella project), clarify that study procedures are not intended to benefit subjects, and add process for managing incidental MRI findings; and added the following documents: 1. "BL PTSD_Ads" 2. "NPR Underwriting" 3. BLPTSD_COVID-19_PTX_Cancelation_Email.doc 4. BLPTSD_COVID-19_PTX_Questionnaires_Email.doc.
IRB approved date: April 11, 2020

Amendment 33: removed Anna Burns and Kristen Shepard from personnel list and updated CITI dates for Patricia Haynes, Ph.D.
IRB approved date: May 29, 2020

- **Actual or anticipated problems or delays and actions or plans to resolve them**

Nothing to report.

- **Changes that have a significant impact on expenditures**
  Nothing to report.

- **Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents**
  Nothing to report.

6. PRODUCTS

Our sample was not sufficiently powered for detailed analysis until the later years of our study (i.e. 2016-present). Nevertheless, we conducted unpublished preliminary analyses on our initial dataset during Years 1-3, then shifted our focus to conference and symposium abstracts and presentations once our sample was sufficiently large. A full list of published and unpublished data analyses is located in Appendix D. Below is a bibliography of all conference and symposium publications, abstracts, and presentations.

- **Publications, conference papers, and presentations**

  - **Journal publications**
    Nothing to Report – manuscripts for publication in progress.

  - **Books or other non-periodical one-time publications**
    Nothing to Report

  - **Other publications, conference papers, and presentations**

The following conference abstracts were presented:

Alkozei, A., Smith, R., Fridman A., Dormer, A., Challener, S., Grandner, M., Killgore, W.D.S. *Daily Morning Blue Light Exposure Leads to Changes in Functional Brain Responses During Emotional Anticipation in Individuals with PTSD*. 2016, SLEEP.

Alkozei, A., Smith, R., Fridman, A., Dormer, A., Challener, S., Killgore, W.D.S. *Neural responses to emotional stimuli in individuals with PTSD after daily morning blue light exposure*. 2016, SoBP.

Alkozei, A., Smith, R., Fridman, A., Dormer, A., Challener, S., Killgore, W.D.S. *The Role of Trait Gratitude on Functional Brain Activation Changes When Anticipating Negative Events in Individuals With PTSD*. 2016, SoBP.

Fridman, A., Alkozei, A., Smth, R., Challener, S., Knight, S., Killgore, W.D.S. *Resiliency Is Associated with Less Activation within the Retrosplenial Cortex and Secondary Motor Area for Individuals with PTSD During Anticipation of a Negative Event.* 2016, SoBP.

Challener, S, Alkozei, A., Andrew Fridman, Dormer, A., & Killgore, W.D.S. *Higher Depressive Symptoms are Associated with Lower Activation in the Orbital Frontal Cortex When Anticipating Negative Stimuli in Individuals with PTSD*. 2017, JIPF.

Challener, S., Alkozei, A., Yung, A., Ozcan, M., Raikes, A.C., Killgore W.D.S. *Sleep Problems are Associated with Greater Default Mode Network Activation When Anticipating Negative Stimuli in Individuals with PTSD*. 2018, SoBP.

Ozcan, M., Challener, S., Yung, A., Alkozei, A., Raikes, A.C., Killgore, W.D.S. *Daytime Sleepiness in Individuals with PTSD is Associated with Greater Activation in the Right Angular Gyrus When Viewing Negative Images*. 2018, SoBP.

Yung, A., Challener, S., Ozcan, M., Alkozei, A., Raikes, A.C., Killgore, W.D.S. *Improvements in PTSD Symptom Severity are Associated with Greater Activation in the Hippocampus During Anticipation of Negative Stimuli.* 2018, SoBP.

Challener, S., Alkozei, A., Yung, A., Ozcan, M., Raikes, A.C., Killgore, W.D.S. *Functional Impairment Due to Excessive Daytime Sleepiness is Associated with Greater Activation in the Default Mode Network When Anticipating Negative Stimuli in Individuals with PTSD.* 2018, APSS.

Burns, A., Shepard, K.C., Ozcan, M., Alkozei, A., Vanuk, J. R., & Killgore, W.D.S. *The Association Between Morningness-Eveningness and Nightmares in PTSD.* 2018, INS.

Burns, A., Ozcan, M., Shepard, K.C., Alkozei, A., Vanuk, J. R., & Killgore, W.D.S. *The Association Between PTSD Severity and Life Satisfaction is Mediated by Trait Gratitude*. 2018, INS.

Ozcan, M., Shepard, K.C., Burns, A., Alkozei, A., Killgore, W.D.S. *Trait gratitude and the impact of excessive daytime sleepiness on daily functioning predict PTSD severity over time.* 2018, INS.

Shepard, K.C., Ozcan, M., Burns, A., Alkozei, A., Vanuk, J. R., & Killgore, W.D.S. *Differences in Anxiety Reduction between Minority and Majority Racial Groups Participating in Morning Blue Light Exposure*. 2018, INS.

Shepard, K.C., Burns, A., Ozcan, M., Alkozei, A., Killgore, W.D.S. *Racial Differences Regarding the Effectiveness of Blue Light Therapy in Reducing PTSD Severity*. 2018, INS.

Burns, A., Ozcan, M., Shepared, K.C, LaFollette, K., Alkozei, A., Gradner, M., Killgore, W.D.S. *The Association Between PTSD Severity and Insomnia is Mediated by Nightmares.* 2019, SLEEP.

Burns, A., Shepard, K.C., Ozcan, M., LaFollette, K., Alkozei, A., Vanuk, J., Raikes, A., Gradner, M., Killgore, W.D.S. *Gratitude and Frequency of Naps Predict Resilience for Individuals with PTSD.* 2019, SLEEP.

Killgore, W.D.S., Pace-Schott, E., Ozcan, M., Shepard, K.C., Burns, A., Gradner, M., Vanuk, J., Alkozei, A. *Morning Blue Light Exposure Improves Sleep and Fear Extinction Recall in PTSD* 2019, SLEEP.

Ozcan, M., Shepard, K.C., Burns, A., Raikes, A., Dailey, N., Alkozei, A., Gradner, M., Killgore, W.D.S. *Individuals with PTSD whose traumatic experiences occurred within the home have worse sleep outcomes.* 2019*,* SLEEP.

Ozcan, M., Shepard, K.C., Burns, A., Raikes, A., Dailey, N., Alkozei, A., Gradner, M., Killgore, W.D.S. *PTSD Severity and Use of Negative Emotion Words in Trauma Narratives Predict Nightmares in Individuals with PTSD.* 2019, SLEEP.

Shepard, K.C., Ozcan, M., Burns, A., Vanuk, J., Gradner, M., Alkozei, A. Killgore, W.D.S. *The Relationships between Psychopathology and Sleep Problems Differ Between Racial Majority and Minority Groups.* 2019, SLEEP

Shepard, K.C., Ozcan, M., Burns, A., Gradner, M., Killgore, W.D.S. *Use of Anger Words in Trauma Narratives is Negatively Associated with Sleep Quality for Single Individuals with PTSD.* 2019, SLEEP.

Burns, A., Ozcan, M., Shepard, K.C., Alkozei, A., Vanuk, J., Killgore, W.D.S. *The Relationship Between Sleep Onset Latency and Gratitude.* 2019, MHSRS.

Killgore, W.D.S., Ozcan, M., Shepard, K.C., Burns, A., Vanuk, J., Alkozei, A. *Blue Light Exposure Enhances Sleep and Fear Extinction Recall in PTSD.* 2019, MHSRS.

Ozcan, M., Burns, A., Shepard, K.C., Alkozei, A., Killgore, W.D.S. *The relationship between combat and non-combat trauma and risk-taking propensity in individuals with PTSD.* 2019, MHSRS.

Shepard, K.C., Ozcan, M., Burns, A., Alkozei, A., Killgore, W.D.S. *Blue Light Therapy Differences in Sleep Quality Improvement in Military and Civilian Populations.* 2019, MHSRS

Bullock, A., Burns, A., Shepard, K.C., Alkozei, A., Killgore, W.D.S. *Alterations in Cognitive Symptoms of PTSD are Correlated with Somatic Symptoms.* INS, 2019.

Jecman, D., King, R., Gould, J., Mitchell, J., Ralston, K., Alkozei, A., Killgore, W.D.S. *The Effect of Blue Light Therapy on Functional Brain Responses to Masked Fearful Stimuli in Post-Traumatic Stress Disorder.* 2020, SoBP.

Killgore, WDS. *Modifying Sleep and Circadian Rhythms with Light to Facilitate Recovery from Post-Traumatic Stress Disorder*. Symposium Presentation. 2020, SoBP.

Killgore, WD. *Blue light therapy enhances sleep and fear extinction recall in PTSD.* Symposium Presentation. 2020, SoBP.

Killgore, WD, Burns, AI, Bullock, A, Vanuk, JR, Taylor, E, & Alkozei, A. *Morning blue light improves consolidation of fear extinction memory in PTSD*. 2020, SoBP.

King, R., Jecmen, D., Mitchell, J., Ralston, K., Gould, J., Burns, A., Bullock, A., Alkozei, A., & Killgore, W.D.S. *Co-morbid depressive symptoms are associated with reduced functional brain responses within the insula and visual cortex in response to masked happy faces in individuals with PTSD.* (accepted). 2020, SoBP.

Bullock, A., Shepard, C., Burns, A., Raikes, A., Alkozei, A., Killgore, W.D.S. *Use of Family Words in Trauma Narratives Predicts a Higher Risk of Insomnia in Individuals with PTSD*. 2020, ADAA.

Killgore, W., Burns, A., Bullock, A., Vanuk, J., Taylor, E., Alkozei, A. *Using Blue Light to Consolidate Fear Extinction Memory in PTSD.* 2020, ADAA.

Bullock, A., Burns, A., Alkozei, A., Taylor, E., Grandner, M., Killgore, W.D.S. *Nightmares are Negatively Associated with Immediate Memory and Visuospatial Performance in Individuals with PTSD.* 2020, Sleep.

Bullock, A., Burns, A., Taylor, E., Grandner, M., Miller, M., Alkozei, A., Killgore, W.D.S. *Self-referential Language in Trauma Narratives Predicts Shorter Sleep Duration in Women with PTSD.* 2020, Sleep.

Burns, A., Bullock, Taylor, E., Grandner, M., A., Alkozei, A., Killgore, W.D.S. *The Association Between Sleep Problems and Risk-taking Behavior Differs Between Racial Majority and Minority Groups.* 2020, Sleep.

Jecman, D., King, R., Gould, J., Mitchell, J., Ralston, K., Burns, A., Bullock, A., Grandner, M., Alkozei, A., Killgore, W.D.S. *The Effects of Morning Blue Light Therapy on Insomnia Severity and PTSD Symptoms in a Clinical Sample.* 2020, Sleep.

King, R., Jecmen, D., Mitchell, J., Ralston, K., Gould, J., Burns, A., Grandner, M., Alkozei, A., Killgore, W.D.S. *Habitual Sleep Duration is Negatively Correlated with Emotional Reactivity within the Rostral Anterior Cingulate Cortex in Individuals with PTSD*. Sleep, 2020.

Killgore, WD, Burns, AI, Shepard, KC, Vanuk, JR, & Alkozei, A. *Enhancing fear extinction recall in PTSD using blue light therapy.* 2020, SLEEP.

King, R., Jecmen, D., Mitchell, J., Ralston, K., Gould, J., Burns, A., Bullock, A., Alkozei, A., & Killgore, W.D.S. *The Effect of PTSD and Co-morbid Depressive Symptoms on Functional Brain Responses to Masked Positive Stimuli.* 2020, MHSRS.

Ralston, K., King, R., Jecmen, D., Mitchell, J., Gould, J., Burns, A., Bullock, A., Alkozei, A., & Kilgore, W.D.S. *The Effects of Blue Light Therapy on Sleep Latency in Individuals with PTSD: Potential Gender Differences.* 2020, MHSRS.

Vanuk, JR, Alkozei, A, Burns, AI, Bullock, AD, & Killgore, WD. *Sleep and fear extinction recall in PTSD improves with morning blue light exposure therapy*. 2020, American Psychosomatic Society.

Valencia, L., Bullock, A., Miller, M., Johnson, J., Killgore, W.D.S. *Incorporation of Cardio Exercise is Associated to Increased Levels of Gratitude Among PTSD Patients.* 2021, INS.

Vanuk, J., Bullock, A., Forbeck, B., Dailey, N., Killgore, W.D.S. *Severity of PTSD Symptoms is Associated with Greater Levels of Depression and Deficits in Short-Term Memory.* 2021, INS.

Ralston, KN, King, R, Bullock, A, Alkozei, A, & Killgore, WD. *Blue light therapy for sleep latency in individuals with PTSD: Sex differences.* 2021, MHSRS.

- **Website(s) or other Internet site(s)**
  Nothing to Report

- **Technologies or techniques**
  Nothing to Report

- **Inventions, patent applications, and/or licenses**
  Nothing to Report

- **Other products**
  Nothing to Report

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

- **What individuals have worked on the project?**

Year 7 Quarter 2 Financial Information

Name: William D. "Scott" Killgore, Ph.D.
Project Role: Principal Investigator
Researcher identifier: 0000-0002-5328-0208
Nearest person month worked: 4
Contribution to Project: Dr. Killgore oversaw all aspects of the project progress, including formal presentations, data analysis and publication efforts.
Funding Support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062
USAMRAA W81XWH-19-1-0074
USAMRAA W81XWH2010173

Name: Patricia Haynes
Project Role: Co-Investigator
Researcher identifier: 0000-0003-2535-9506
Nearest person month worked: 0.002
Contribution to Project: : Dr. Haynes assisted with neuroimaging sequences and analysis.

Name: Emily Taylor
Project Role: Lab Manager
Nearest person month worked: 0.750
Contribution to Project: Ms. Taylor oversaw the administrative needs of the study and study staff, and provided regulatory support and periodic quality control checks.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Michael Miller
Project Role: Research Specialist
Nearest person month worked: 0.750
Contribution to Project: Mr. Miller oversaw the administrative needs of the study and study staff, and provided scientific/regulatory support and periodic quality control checks.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Natalie Dailey, Ph.D.
Project Role: Research Scientist
Researcher identifier: 0000-0003-4800-4118
Nearest person month worked: 0.750
Contribution to Project: Dr. Dailey performed data analysis and processing for the project.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062
USAMRAA W81XWH2010173

Name: Matthew Allbright

Project Role: Research Technician
Nearest person month worked: 0.750
Contribution to Project: Mr. Allbright provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Ron Ian Victor Anlap
Project Role: Research Technician
Nearest person month worked: 0.750
Contribution to Project: Mr. Anlap provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Ayla Bullock
Project Role: Lead Research Technician
Nearest person month worked: 0.990
Contribution to Project: Ms. Bullock provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062
USAMRAA W81XWH2010173

Name: Sara Cloonan
Project Role: Research Technician
Nearest person month worked: 0.375
Contribution to Project: Ms. Cloonan provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Brittany Elizabeth Forbeck
Project Role: Research Technician
Nearest person month worked: 0.525
Contribution to Project: Ms. Forbeck provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Michael James Strong
Project Role: Research Technician
Nearest person month worked: 0.300

Contribution to Project: Mr. Strong provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Nathan Swift
Project Role: Research Technician
Nearest person month worked: 0.300
Contribution to Project: Mr. Swift provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

Name: Jason Ryan Johnson
Project Role: Research Technician
Nearest person month worked: 0.750
Contribution to Project: Mr. Johnson provided support with data collection and recruitment activities.
Funding support:

USAMRAA W81XWH-14-1-0570
USAMRAA W81XWH-16-1-0062

List of individuals who have received pay for the research effort (alphabetical order by surname):
Anna Alkozei, PhD
Matthew Chedister Allbright
Ron Ian Victor Anlap
Sahil Bajaj
Cameron Akira Barnes
Sarah Berryhill
Renata Botello
Ayla Bullock
Anna Burns
Skye Challener
Miriam Chinkers
Sara Cloonan
Natalie S. Dailey, PhD
James Eric Joshua Del Toro
Alyssa Dormer
Simon Louis Esbit
Brittany Elizabeth Forbeck
Andrew J. Fridman
Melissa Kelly Gottschlich
Trevor Grant
Patricia L. Haynes, PhD
Yinya Huang
Simone Hyman
Jason Ryan Johnson

William D.S. Killgore, PhD
Aleksandra Klimova
Sara A Knight
Kyle Lafollette
Michael Phillip Lazar
Jacqueline Olivia Marquez
Miyla Briana McIntosh
Melissa Millan
Michael A Miller
Meltem Ozcan
William Ned Palmer
Sairam Parasarathy
Derek Alexander Pisner
Adam C Raikes, PhD
Anna Andrea Sanova
Brieann Satterfield
Bradley Russell Shane
Kristin Caleigh Shepard
Anmol Singh
Prabhjyot Singh
Jeffrey Skalamera
Courtney Taylor Smith
Ryan Scott Smith
Michael James Strong
Nathan Swift
Matthew Thurston
Theodore P. Truoard, PhD
John R. Vanuk
Sydney Wilkerson
Rebecca Ann Woods-Lubbert
Joseph Yee II

- **Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?**
  Nothing to report.

- **What other organizations were involved as partners?**
  Nothing to report.

8. SPECIAL REPORTING REQUIREMENTS
Please see updated Quad Chart attached in Appendix.

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Appendix A. Assessment Table

Assessment	Outcome Measure
Alcohol Use Disorders Identification Test (AUDIT)	Detects hazardous alcohol use. A score of 8 or more is indicative of hazardous alcohol use.
Beck Anxiety Inventory (BAI)	Measures severity of anxiety.
Balloon Analogue Risk Task	Measures risk-taking propensity.
Beck Depression Inventory 2 (BDI-2)	Measures severity of depression symptoms.
Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)	Assesses PTSD symptoms in the past month.
Combat Exposure Scale (CES)	Determines degree of exposure to combat (e.g. number of times the participant was surrounded by the enemy)
Connor-Davidson Resilience Scale (CD-RISC)	Assesses resilience.
Day of Scan Questionnaire (DSIQ)	A collection of questions relating to demographics, caffeine, alcohol/nicotine use, exercise, appetite, general self-report sleep metrics ("Do you ever have trouble falling asleep? How often per week, month, or year?").
Disturbing Dreams and Nightmares Severity Index (DDNSI)	Measures frequency and severity of nightmares.
Edinburgh Handedness Inventory (EHI)	Determines laterality quotient (LQ) which ranges from -100 (indicates extreme left hand preference) to 100 (indicates extreme right hand preference). Also determines decile rank of handedness (e.g. 1^{st}-10^{th} decile left or 1^{st}-10^{th} decile right)
Epworth Sleepiness Scale (ESS)	Assesses daytime sleepiness.
Evaluation of Risks Scale (EVAR)	Assesses risk-taking propensity.
Functional Outcomes of Sleep Questionnaire (FOSQ)	Measures degree of impact of sleep loss on daily functioning.
Gratitude Questionnaire-6 items (GQ-6)	Measures gratitude in daily life.
Insomnia Severity Index (ISI)	Current insomnia severity.
Marijuana Use Questionnaire (MUSE)	Measure of recent marijuana use.
Morningness-Eveningness Questionnaire (MEQ)	Measures timing of peak alertness (morning, evening, or in between). Composite score denotes degree of preference for morning.
Patient Health Questionnaire-9 items (PHQ-9)	Measures depression symptoms.
Pittsburgh Sleep Quality Index (PSQI)	Sleep habits and sleep quality in the past month.
(Fear Conditioning) Post-Conditioning Questions	Assesses subjective efficacy of fear conditioning
(Fear Conditioning) Post-Extinction Questions	Assesses subjective efficacy of fear extinction
(Fear Conditioning) Retrospective Questions	Assesses recall of fear conditioning and extinction
(Fear Conditioning) Renewal Questions	Assesses subjective efficacy of fear extinction
PTSD Checklist for DSM-5 (PCL-5)	Current PTSD symptom severity.
Psychomotor Vigilance Test (PVT)	Measures psychomotor vigilance to assess sleepiness.
Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)	Assesses immediate memory, delayed memory, visuospatial reasoning, language, and global neuropsychological functioning.
Rivermead Post Concussion Symptoms Questionnaire (RPCSQ)	Examines presence and severity of symptoms (e.g. headache, dizziness) via self report.

Satisfaction with Life Scale (SWLS)	Current satisfaction with life.
Stanford Sleepiness Scale (SSS)	Measures current sleepiness.
State-Trait Anxiety Inventory (STAI)	Assesses state-level and trait-level anxiety.
Structured Clinical Interview for the DSM-5 (SCID)	Determines if the participant meets criteria for DSM-5 diagnoses. Used in this study as a screening measure to ensure that PTSD criteria are met, and to ensure that criteria are *not* met for exclusionary disorders (e.g. bipolar, schizophrenia).
The Anticipation Task	Measures neurological responses to anticipation of negative stimuli.
Trauma History Screen (THS)	Collects qualitative details of the trauma and participant's reaction to the trauma. A basic descriptor of the trauma (e.g. "a really bad car, boat, train, or airplane accident"), age at trauma, number of times the trauma happened, emotional reaction to the event, duration of distress, degree of distress attributable to the trauma.
Treatment Perception Questionnaire	Assesses participant's perception of which condition they received, and how certain they are of their perception.
Wechsler Abbreviated Scale of Intelligence - 2 (WASI-2)	Measures IQ. All four subsections were administered. Used as a screening measure.
Wide Range Achievement Test - 4 (WRAT-4)	Measures reading skills, used as a screening measure to ensure English proficiency. Only the reading skills section was administered.

Appendix B. Assessments **Alcohol Use Disorders Identification Test (AUDIT)**

Subject ID: _____ Date: _____

The following questions concern your alcohol consumption. Place an X in one box that best describes your answer to each question.

Questions	0	1	2	3	4	
1. How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week	
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	
3. How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
4. How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
5. How often during the last year have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
8. How often during the last year have you been unable to remember what happened the night before because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
9. Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	
					Total	

Beck Anxiety Inventory

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____ .

Interpretation

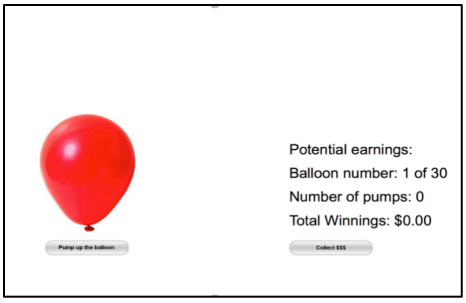
A grand sum between **0 – 21** indicates very low anxiety. That is usually a good thing. However, it is possible that you might be unrealistic in either your assessment which would be denial or that you have learned to "mask" the symptoms commonly associated with anxiety. Too little "anxiety" could indicate that you are detached from yourself, others, or your environment.

A grand sum between **22 – 35** indicates moderate anxiety. Your body is trying to tell you something. Look for patterns as to when and why you experience the symptoms described above. For example, if it occurs prior to public speaking and your job requires a lot of presentations you may want to find ways to calm yourself before speaking or let others do some of the presentations. You may have some conflict issues that need to be resolved. Clearly, it is not "panic" time but you want to find ways to manage the stress you feel.

A grand sum that **exceeds 36** is a potential cause for concern. Again, look for patterns or times when you tend to feel the symptoms you have circled. Persistent and high anxiety is not a sign of personal weakness or failure. It is, however, something that needs to be proactively treated or there could be significant impacts to you mentally and physically. You may want to consult a counselor if the feelings persist.

Balloon Analogue Risk Task

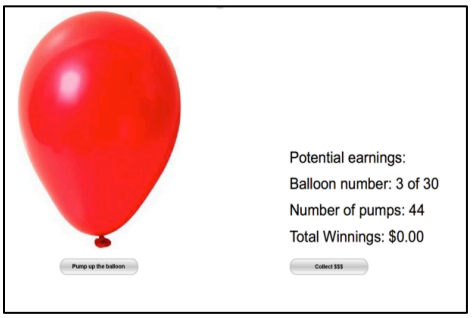
Inflate the Balloon by Pressing Key



The BART presents participants with 30 virtual balloons.

-Each balloon can be inflated one increment for each key press.

Balloon Grows in Size and Monetary Value

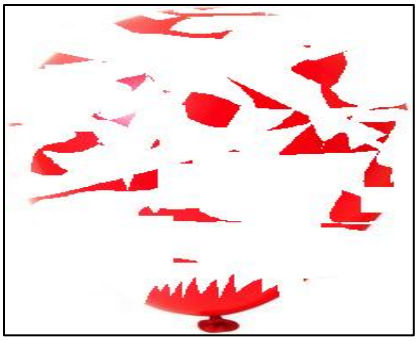


-With each key press the size of the balloon increases.

-Each increment also increases the potential value of the balloon by 5 cents.

-The balloon can be "cashed in" at any time and the total accumulated value retained.

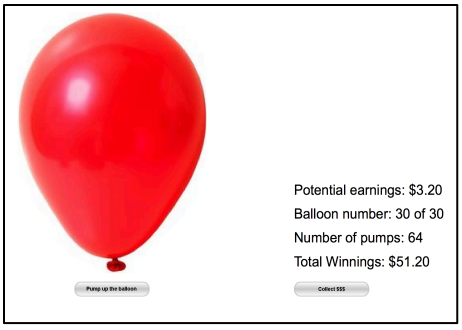
If Balloon Explodes, All $$$ is Lost



-Each Balloon can explode at any time.

-If a balloon explodes, all of the potential money accumulated *for that balloon* will be lost.

Goal: Earn as Much Money as Possible



-The goal is to maximize winnings

-Only 30 balloons are presented.

BDI-II

Date:

Subject ID: _____ Marital Status: _____ Age: _____ Sex: _____

Occupation: _____ Education: _____

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today.** Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness
- 0 I do not feel sad.
- 1 I feel sad much of the time.
- 2 I am sad all the time.
- 3 I am so sad or unhappy that I can't stand it.

2. Pessimism
- 0 I am not discouraged about my future.
- 1 I feel more discouraged about my future than I used to be.
- 2 I do not expect things to work out for me.
- 3 I feel my future is hopeless and will only get worse.

3. Past Failure
- 0 I do not feel like a failure.
- 1 I have failed more than I should have.
- 2 As I look back, I see a lot of failures.
- 3 I feel I am a total failure as a person.

4. Loss of Pleasure
- 0 I get as much pleasure as I ever did from the things I enjoy.
- 1 I don't enjoy things as much as I used to.
- 2 I get very little pleasure from the things I used to enjoy.
- 3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings
- 0 I don't feel particularly guilty.
- 1 I feel guilty over many things I have done or should have done.
- 2 I feel quite guilty most of the time.
- 3 I feel guilty all of the time.

6. Punishment Feelings
- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

7. Self-Dislike
- 0 I feel the same about myself as ever.
- 1 I have lost confidence in myself.
- 2 I am disappointed in myself.
- 3 I dislike myself.

8. Self-Criticalness
- 0 I don't criticize or blame myself more than usual.
- 1 I am more critical of myself than I used to be.
- 2 I criticize myself for all of my faults.
- 3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes
- 0 I don't have any thoughts of killing myself.
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

10. Crying
- 0 I don't cry any more than I used to.
- 1 I cry more than I used to.
- 2 I cry over every little thing.
- 3 I feel like crying, but I can't.

Subtotal Page 1

Continued on Back

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11. Agitation

0 I am no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

14. Worthlessness

0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as I used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0 I have not experienced any change in my sleeping pattern.

1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.

2a I sleep a lot more than usual.
2b I sleep a lot less than usual.

3a I sleep most of the day.
3b I wake up 1–2 hours early and can't get back to sleep.

17. Irritability

0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

18. Changes in Appetite

0 I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater than usual.

2a My appetite is much less than before.
2b My appetite is much greater than usual.

3a I have no appetite at all.
3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of the things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

_____	Subtotal Page 2
_____	Subtotal Page 1
_____	Total Score

281283-2 987

National Center for PTSD

CLINICIAN-ADMINISTERED PTSD SCALE FOR DSM-5

PAST MONTH VERSION

Subject ID: _____ ID#: _____

Interviewer: _____ Date: _____

Study: _____

Frank W. Weathers, Dudley D. Blake, Paula P. Schnurr,
Danny G. Kaloupek, Brian P. Marx, & Terence M. Keane

National Center for Posttraumatic Stress Disorder
October 28, 2013

Instructions

Standard administration and scoring of the CAPS-5 are essential for producing reliable and valid scores and diagnostic decisions. The CAPS-5 should be administered only by qualified interviewers who have formal training in structured clinical interviewing and differential diagnosis, a thorough understanding of the conceptual basis of PTSD and its various symptoms, and detailed knowledge of the features and conventions of the CAPS-5 itself.

Administration

1. Identify an index traumatic event to serve as the basis for symptom inquiry. Administer the Life Events Checklist and Criterion A inquiry provided on p. 5, or use some other structured, evidence-based method. The index event may involve either a single incident (e.g., “the accident”) or multiple, closely related incidents (e.g., “the worst parts of your combat experiences”).

2. Read prompts verbatim, one at a time, and in the order presented, EXCEPT:

    a. Use the respondent’s own words for labeling the index event or describing specific symptoms.

    b. Rephrase standard prompts to acknowledge previously reported information, but return to verbatim phrasing as soon as possible. For example, inquiry for item 20 might begin: “You already mentioned having problems sleeping. What kinds of problems?”

    c. If you don’t have sufficient information after exhausting all standard prompts, follow up ad lib. In this situation, repeating the initial prompt often helps refocus the respondent.

    d. As needed, ask for specific examples or direct the respondent to elaborate even when such prompts are not provided explicitly.

3. In general, DO NOT suggest responses. If a respondent has pronounced difficulty understanding a prompt it may be necessary to offer a brief example to clarify and illustrate. However, this should be done rarely and only after the respondent has been given ample opportunity to answer spontaneously.

4. DO NOT read rating scale anchors to the respondent. They are intended only for you, the interviewer, because appropriate use requires clinical judgment and a thorough understanding of CAPS-5 scoring conventions.

5. Move through the interview as efficiently as possible to minimize respondent burden. Some useful strategies:

    a. Be thoroughly familiar with the CAPS-5 so that prompts flow smoothly.

    b. Ask the fewest number of prompts needed to obtain sufficient information to support a valid rating.

    c. Minimize note-taking and write while the respondent is talking to avoid long pauses.

    d. Take charge of the interview. Be respectful but firm in keeping the respondent on task, transitioning between questions, pressing for examples, or pointing out contradictions.

Scoring

1. As with previous versions of the CAPS, CAPS-5 symptom severity ratings are based on symptom frequency and intensity, except for items 8 (amnesia) and 12 (diminished interest), which are based on amount and intensity. However, CAPS-5 items are rated with a single severity score, in contrast to previous versions of the CAPS which required separate frequency and intensity scores for each item that were either summed to create a symptom severity score or combined in various scoring rules to create a dichotomous (present/absent) symptom score. Thus, on the

CAPS-5 the clinician combines information about frequency and intensity before making a single severity rating. Depending on the item, frequency is rated as either the number of occurrences (how often in the past month) or percent of time (how much of the time in the past month). Intensity is rated on a four-point ordinal scale with ratings of *Minimal*, *Clearly Present*, *Pronounced*, and *Extreme*. Intensity and severity are related but distinct. Intensity refers to the strength of a typical occurrence of a symptom. Severity refers to the total symptom load over a given time period, and is a combination of intensity and frequency. This is similar to the quantity/frequency assessment approach to alcohol consumption. In general, intensity rating anchors correspond to severity scale anchors described below and should be interpreted and used in the same way, except that severity ratings require joint consideration of intensity and frequency. Thus, before taking frequency into account, an intensity rating of *Minimal* corresponds to a severity rating of *Mild / subthreshold*, *Clearly Present* corresponds with *Moderate / threshold*, *Pronounced* corresponds with *Severe / markedly elevated*, and *Extreme* corresponds with *Extreme / incapacitating*.

2. The five-point CAPS-5 symptom severity rating scale is used for all symptoms. Rating scale anchors should be interpreted and used as follows:

   0 ***Absent*** The respondent denied the problem or the respondent's report doesn't fit the DSM-5 symptom criterion.

   1 ***Mild / subthreshold*** The respondent described a problem that is consistent with the symptom criterion but isn't severe enough to be considered clinically significant. The problem doesn't satisfy the DSM-5 symptom criterion and thus doesn't count toward a PTSD diagnosis.

   2 ***Moderate / threshold*** The respondent described a clinically significant problem. The problem satisfies the DSM-5 symptom criterion and thus counts toward a PTSD diagnosis. The problem would be a target for intervention. This rating requires a minimum frequency of *2 X month* or *some of the time (20-30%)* PLUS a minimum intensity of *Clearly Present*.

   3 ***Severe / markedly elevated*** The respondent described a problem that is well above threshold. The problem is difficult to manage and at times overwhelming, and would be a prominent target for intervention. This rating requires a minimum frequency of *2 X week* or *much of the time (50-60%)* PLUS a minimum intensity of *Pronounced*.

   4 ***Extreme / incapacitating*** The respondent described a dramatic symptom, far above threshold. The problem is pervasive, unmanageable, and overwhelming, and would be a high-priority target for intervention.

3. In general, make a given severity rating only if the minimum frequency and intensity for that rating are both met. However, you may exercise clinical judgment in making a given severity rating if the reported frequency is somewhat lower than required, but the intensity is higher. For example, you may make a severity rating of *Moderate / threshold* if a symptom occurs *1 X month* (instead of the required *2 X month*) as long as intensity is rated *Pronounced* or *Extreme* (instead of the required *Clearly Present*). Similarly, you may make a severity rating of *Severe / markedly elevated* if a symptom occurs *1 X week* (instead of the required *2 X week*) as long as the intensity is rated *Extreme* (instead of the required *Pronounced*). If you are unable to decide between two severity ratings, make the lower rating.

4. You need to establish that a symptom not only meets the DSM-5 criterion phenomenologically, but is also functionally related to the index traumatic event, i.e., started or got worse as a result of the event. CAPS-5 items 1-8 and 10 (reexperiencing, effortful avoidance, amnesia, and blame) are inherently linked to the event. Evaluate the remaining items for trauma-relatedness (TR) using the TR inquiry and rating scale. The three TR ratings are:

   a. ***Definite*** = the symptom can clearly be attributed to the index trauma, because (1) there is an obvious change from the pre-trauma level of functioning and/or (2) the respondent makes the attribution to the index trauma with confidence.

   b. ***Probable*** = the symptom is likely related to the index trauma, but an unequivocal connection can't be made. Situations in which this rating would be given include the following: (1) there seems to be a change from the pre-

trauma level of functioning, but it isn't as clear and explicit as it would be for a "definite;" (2) the respondent attributes a causal link between the symptom and the index trauma, but with less confidence than for a rating of *Definite*; (3) there appears to be a functional relationship between the symptom and inherently trauma-linked symptoms such as reexperiencing symptoms (e.g., numbing or withdrawal increases when reexperiencing increases).

c. ***Unlikely*** = the symptom can be attributed to a cause other than the index trauma because (1) there is an obvious functional link with this other cause and/or (2) the respondent makes a confident attribution to this other cause and denies a link to the index trauma. Because it can be difficult to rule out a functional link between a symptom and the index trauma, a rating of *Unlikely* should be used only when the available evidence strongly points to a cause other than the index trauma. NOTE: Symptoms with a TR rating of *Unlikely* should not be counted toward a PTSD diagnosis or included in the total CAPS-5 symptom severity score.

5. **CAPS-5 total symptom severity score** is calculated by summing severity scores for items 1-20. NOTE: Severity scores for the two dissociation items (29 and 30) should NOT be included in the calculation of the total CAPS-5 severity score.

6. **CAPS-5 symptom cluster severity scores** are calculated by summing the individual item severity scores for symptoms contained in a given DSM-5 cluster. Thus, the Criterion B (reexperiencing) severity score is the sum of the individual severity scores for items 1-5; the Criterion C (avoidance) severity score is the sum of items 6 and 7; the Criterion D (negative alterations in cognitions and mood) severity score is the sum of items 8-14; and the Criterion E (hyperarousal) severity score is the sum of items 15-20. A symptom cluster score may also be calculated for dissociation by summing items 29 and 30.

7. **PTSD diagnostic status** is determined by first dichotomizing individual symptoms as "present" or "absent," then following the DSM-5 diagnostic rule. A symptom is considered present only if the corresponding item severity score is rated *2=Moderate/threshold* or higher. Items 9 and 11-20 have the additional requirement of a trauma-relatedness rating of *Definite* or *Probable*. Otherwise a symptom is considered absent. The DSM-5 diagnostic rule requires the presence of least one Criterion B symptom, one Criterion C symptom, two Criterion D symptoms, and two Criterion E symptoms. In addition, Criteria F and G must be met. Criterion F requires that the disturbance has lasted at least one month. Criterion G requires that the disturbance cause either clinically significant distress or functional impairment, as indicated by a rating of *2=moderate* or higher on items 23-25.

Criterion A: Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

1. **Directly experiencing the traumatic event(s).**
2. **Witnessing, in person, the event(s) as it occurred to others.**
3. **Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.**
4. **Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.**

[Administer Life Events Checklist or other structured trauma screen]

I'm going to ask you about the stressful experiences questionnaire you filled out. First I'll ask you to tell me a little bit about the event you said was the worst for you. Then I'll ask how that event may have affected you over the past month. In general I don't need a lot of information – just enough so I can understand any problems you may have had. Please let me know if you find yourself becoming upset as we go through the questions so we can slow down and talk about it. Also, let me know if you have any questions or don't understand something. Do you have any questions before we start?

The event you said was the worst was (EVENT). What I'd like for you to do is briefly describe what happened.

Index event (specify):

What happened? *(How old were you? How were you involved? Who else was involved? Was anyone seriously injured or killed? Was anyone's life in danger? How many times did this happen?)*	*Exposure type:* *Experienced ___* *Witnessed ___* *Learned about ___* *Exposed to aversive details___* *Life threat? NO YES [self ___ other ___]* *Serious injury? NO YES [self ___ other ___]* *Sexual violence? NO YES [self ___ other ___]* *Criterion A met? NO PROBABLE YES*

For the rest of the interview, I want you to keep (EVENT) in mind as I ask you about different problems it may have caused you. You may have had some of these problems before, but for this interview we're going to focus just on the past month. For each problem I'll ask if you've had it in the past month, and if so, how often and how much it bothered you.

Criterion B: Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:

1. (B1) Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). Note: In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.

In the past month, have you had any <u>unwanted</u> <u>memories</u> of (EVENT) while you were awake, so not counting dreams? [Rate 0=Absent if only during dreams] **How does it happen that you start remembering (EVENT)?** [If not clear:] ***(Are these <u>unwanted</u> memories, or are you thinking about [EVENT] on purpose?)*** [Rate 0=Absent unless perceived as involuntary and intrusive] **How much do these memories bother you?** **Are you able to put them out of your mind and think about something else?** <u>Circle</u>: Distress = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How often have you had these memories in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of distress*** Moderate = at least 2 X month / distress clearly present, some difficulty dismissing memories Severe = at least 2 X week / pronounced distress, considerable difficulty dismissing memories	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

2. (B2) Recurrent distressing dreams in which the content and/or affect of the dream are related to the event(s). Note: In children, there may be frightening dreams without recognizable content.

In the past month, have you had any <u>unpleasant</u> <u>dreams</u> about (EVENT)? **Describe a typical dream.** *(What happens?)* [If not clear:] ***(Do they wake you up?)*** [If yes:] ***(What do you experience when you wake up? How long does it take you to get back to sleep?)*** [If reports not returning to sleep:] ***(How much sleep do you lose?)*** **How much do these dreams bother you?** <u>Circle</u>: Distress = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How often have you had these dreams in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of distress*** Moderate = at least 2 X month / distress clearly present, less than 1 hour sleep loss Severe = at least 2 X week / pronounced distress, more than 1 hour sleep loss	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

3. (B3) Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.) Note: In children, trauma-specific reenactment may occur in play.

In the past month, have there been times when you <u>suddenly</u> <u>acted</u> or <u>felt</u> as if (EVENT) were <u>actually</u> <u>happening</u> again? [If not clear:] ***(This is different than thinking about it or dreaming about it – now I'm asking about flashbacks, when you feel like you're actually back at the time of [EVENT], actually reliving it.)*** **How much does it seem as if (EVENT) were happening again?** *(Are you confused about where you actually are?)* **What do you do while this is happening?** *(Do other people notice your behavior? What do they say?)* **How long does it last?** <u>Circle</u>: Dissociation = *Minimal Clearly Present Pronounced Extreme* **How often has this happened in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of dissociation*** Moderate = at least 2 X month / dissociative quality clearly present, may retain some awareness of surroundings but relives event in a manner clearly distinct from thoughts and memories Severe = at least 2 X week / pronounced dissociative quality, reports vivid reliving, e.g., with images, sounds, smells	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

4. (B4) Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

In the past month, have you gotten <u>emotionally</u> <u>upset</u> when <u>something</u> <u>reminded</u> <u>you</u> of (EVENT)? **What kinds of reminders make you upset?** **How much do these reminders bother you?** **Are you able to calm yourself down when this happens?** *(How long does it take?)* <u>Circle</u>: Distress = *Minimal Clearly Present Pronounced Extreme* **How often has this happened in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of distress*** Moderate = at least 2 X month / distress clearly present, some difficulty recovering Severe = at least 2 X week / pronounced distress, considerable difficulty recovering	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

5. (B5) Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

In the past month, have you had any <u>physical</u> <u>reactions</u> when <u>something</u> <u>reminded</u> <u>you</u> of (EVENT)? **Can you give me some examples?** *(Does your heart race or your breathing change? What about sweating or feeling really tense or shaky?)* **What kinds of reminders trigger these reactions?** **How long does it take you to recover?** <u>Circle</u>: Physiological reactivity = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How often has this happened in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of physiological arousal*** Moderate = at least 2 X month / reactivity clearly present, some difficulty recovering Severe = at least 2 X week / pronounced reactivity, sustained arousal, considerable difficulty recovering	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

Criterion C: Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:

6. (C1) Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

In the past month, have you tried to <u>avoid</u> <u>thoughts</u> or <u>feelings</u> about (EVENT)? **What kinds of thoughts or feelings do you avoid?** **How hard do you try to avoid these thoughts or feelings?** *(What kinds of things do you do?)* <u>Circle</u>: Avoidance = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How often in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of avoidance*** Moderate = at least 2 X month / avoidance clearly present Severe = at least 2 X week / pronounced avoidance	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

7. (C2) Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

In the past month, have you tried to <u>avoid</u> <u>things</u> that <u>remind</u> <u>you</u> of (EVENT), like certain people, places, or situations? **What kinds of things do you avoid?** **How much effort do you make to avoid these reminders?** *(Do you have to make a plan or change your activities to avoid them?)* [If not clear:] ***(Overall, how much of a problem is this for you? How would things be different if you didn't have to avoid these reminders?)*** <u>Circle</u>: Avoidance = *Minimal Clearly Present Pronounced Extreme* **How often in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of avoidance*** Moderate = at least 2 X month / avoidance clearly present Severe = at least 2 X week / pronounced avoidance	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

Criterion D: Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

8. (D1) Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).

In the past month, have you had <u>difficulty</u> <u>remembering</u> some <u>important</u> <u>parts</u> of (EVENT)? *(Do you feel there are gaps in your memory of [EVENT]?)* **What parts have you had difficulty remembering?** **Do you feel you should be able to remember these things?** [If not clear:] ***(Why do you think you can't? Did you have a head injury during [EVENT]? Were you knocked unconscious? Were you intoxicated from alcohol or drugs?)*** [Rate 0=Absent if due to head injury or loss of consciousness or intoxication during event] [If still not clear:] ***(Is this just normal forgetting? Or do you think you may have blocked it out because it would be too painful to remember?)*** [Rate 0=Absent if due only to normal forgetting] <u>Circle</u>: Difficulty remembering = *Minimal Clearly Present Pronounced Extreme* **In the past month, how many of the important parts of (EVENT) have you had difficulty remembering?** *(What parts do you still remember?)* *# of important aspects* _____ **Would you be able to recall these things if you tried?** ***Key rating dimensions = amount of event not recalled / intensity of inability to recall*** Moderate = at least one important aspect / difficulty remembering clearly present, some recall possible with effort Severe = several important aspects / pronounced difficulty remembering, little recall even with effort	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

9. (D2) Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., “I am bad,” “No one can be trusted,” “The world is completely dangerous,” “My whole nervous system is permanently ruined”).

In the past month, have you had <u>strong</u> <u>negative</u> <u>beliefs</u> about yourself, other people, or the world? **Can you give me some examples?** *(What about believing things like “I am bad,” “there is something seriously wrong with me,” “no one can be trusted,” “the world is completely dangerous”?)* **How strong are these beliefs?** *(How convinced are you that these beliefs are actually true? Can you see other ways of thinking about it?)* <u>Circle</u>: Conviction = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How much of the time in the past month have you felt that way?** % *of time* _____ **Did these beliefs start or get worse after (EVENT)?** *(Do you think they’re related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite* *Probable* *Unlikely* ***Key rating dimensions = frequency / intensity of beliefs*** Moderate = some of the time (20-30%) / exaggerated negative expectations clearly present, some difficulty considering more realistic beliefs Severe = much of the time (50-60%) / pronounced exaggerated negative expectations, considerable difficulty considering more realistic beliefs	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

10. (D3) Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.

In the past month, have you <u>blamed</u> <u>yourself</u> for (EVENT) or what happened as a result of it? Tell me more about that. *(In what sense do you see yourself as having caused [EVENT]? Is it because of something you did? Or something you think you should have done but didn’t? Is it because of something about you in general?)* **What about <u>blaming</u> <u>someone</u> <u>else</u> for (EVENT) or what happened as a result of it? Tell me more about that.** *(In what sense do you see [OTHERS] as having caused [EVENT]? Is it because of something they did? Or something you think they should have done but didn’t?)* **How much do you blame (YOURSELF OR OTHERS)?** **How convinced are you that [YOU OR OTHERS] are truly responsible for what happened?** *(Do other people agree with you? Can you see other ways of thinking about it?)* [Rate 0=Absent if only blames perpetrator, i.e., someone who deliberately caused the event and intended harm] <u>Circle</u>: Conviction = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How much of the time in the past month have you felt that way?** % *of time* _____ ***Key rating dimensions = frequency / intensity of blame*** Moderate = some of the time (20-30%) / distorted blame clearly present, some difficulty considering more realistic beliefs Severe = much of the time (50-60%) / pronounced distorted blame, considerable difficulty considering more realistic beliefs	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

11. (D4) Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).

In the past month, have you had any <u>strong</u> <u>negative</u> <u>feelings</u> such as fear, horror, anger, guilt, or shame? **Can you give me some examples?** *(What negative feelings do you experience?)* **How strong are these negative feelings?** **How well are you able to manage them?** <u>Circle</u>: Negative emotions = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How much of the time in the past month have you felt that way?** % *of time* _____ **Did these negative feelings start or get worse after (EVENT)?** *(Do you think they're related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite* *Probable* *Unlikely* ***Key rating dimensions = frequency / intensity of negative emotions*** Moderate = some of the time (20-30%) / negative emotions clearly present, some difficulty managing Severe = much of the time (50-60%) / pronounced negative emotions, considerable difficulty managing	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

12. (D5) Markedly diminished interest or participation in significant activities.

In the past month, have you been <u>less</u> <u>interested</u> in <u>activities</u> that you used to enjoy? **What kinds of things have you lost interest in or don't do as much as you used to?** *(Anything else?)* **Why is that?** [Rate 0=Absent if diminished participation is due to lack of opportunity, physical inability, or developmentally appropriate change in preferred activities] **How strong is your loss of interest?** *(Would you still enjoy [ACTIVITIES] once you got started?)* <u>Circle</u>: Loss of interest= *Minimal* *Clearly Present* *Pronounced* *Extreme* **Overall, in the past month, how many of your usual activities have you been less interested in?** % *of activities* _____ **What kinds of things do you still enjoy doing?** **Did this loss of interest start or get worse after (EVENT)?** *(Do you think it's related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite* *Probable* *Unlikely* ***Key rating dimensions = percent of activities affected / intensity of loss of interest*** Moderate = some activities (20-30%) / loss of interest clearly present but still has some enjoyment of activities Severe = many activities (50-60%) / pronounced loss of interest, little interest or participation in activities	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

13. (D6) Feelings of detachment or estrangement from others.

In the past month, have you felt <u>distant</u> or <u>cut off</u> from other people? **Tell me more about that.** **How strong are your feelings of being distant or cut off from others?** *(Who do you feel closest to? How many people do you feel comfortable talking with about personal things?)* <u>Circle</u>: Detachment or estrangement = *Minimal Clearly Present Pronounced Extreme* **How much of the time in the past month have you felt that way?** % *of time* _____ **Did this feeling of being distant or cut off start or get worse after (EVENT)?** *(Do you think it's related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite Probable Unlikely* ***Key rating dimensions = frequency / intensity of detachment or estrangement*** Moderate = some of the time (20-30%) / feelings of detachment clearly present but still feels some interpersonal connection Severe = much of the time (50-60%) / pronounced feelings of detachment or estrangement from most people, may feel close to only one or two people	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

14. (D7) Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

In the past month, have there been times when you had <u>difficulty</u> <u>experiencing</u> <u>positive feelings</u> like love or happiness? **Tell me more about that.** *(What feelings are difficult to experience?)* **How much difficulty do you have experiencing positive feelings?** *(Are you still able to experience any positive feelings?)* <u>Circle</u>: Reduction of positive emotions = *Minimal Clearly Present Pronounced Extreme* **How much of the time in the past month have you felt that way?** % *of time* _____ **Did this trouble experiencing positive feelings start or get worse after (EVENT)?** *(Do you think it's related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite Probable Unlikely* ***Key rating dimensions = frequency / intensity of reduction in positive emotions*** Moderate = some of the time (20-30%) / reduction of positive emotional experience clearly present but still able to experience some positive emotions Severe = much of the time (50-60%) / pronounced reduction of experience across range of positive emotions	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

Criterion E: Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

15. (E1) Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.

In the past month, have there been times when you felt especially irritable or angry and showed it in your behavior? **Can you give me some examples?** *(How do you show it? Do you raise your voice or yell? Throw or hit things? Push or hit other people?)* Circle: Aggression = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How often in the past month?** *# of times* _____ **Did this behavior start or get worse after (EVENT)?** *(Do you think it's related to [EVENT]? How so?)* Circle: Trauma-relatedness = *Definite* *Probable* *Unlikely* ***Key rating dimensions = frequency / intensity of aggressive behavior*** Moderate = at least 2 X month / aggression clearly present, primarily verbal Severe = at least 2 X week / pronounced aggression, at least some physical aggression	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

16. (E2) Reckless or self-destructive behavior.

In the past month, have there been times when you were taking more risks or doing things that might have caused you harm? **Can you give me some examples?** **How much of a risk do you take?** *(How dangerous are these behaviors? Were you injured or harmed in some way?)* Circle: Risk = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How often have you taken these kinds of risks in the past month?** *# of times* _____ **Did this behavior start or get worse after (EVENT)?** *(Do you think it's related to [EVENT]? How so?)* Circle: Trauma-relatedness = *Definite* *Probable* *Unlikely* ***Key rating dimensions = frequency / degree of risk*** Moderate = at least 2 X month / risk clearly present, may have been harmed Severe = at least 2 X week / pronounced risk, actual harm or high probability of harm	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

17. (E3) Hypervigilance.

In the past month, have you been especially <u>alert</u> or <u>watchful</u>, even when there was no specific threat or danger? *(Have you felt as if you had to be on guard?)* **Can you give me some examples?** *(What kinds of things do you do when you're alert or watchful?)* [If not clear:] ***(What causes you to react this way? Do you feel like you're in danger or threatened in some way? Do you feel that way more than most people would in the same situation?)*** <u>Circle</u>: Hypervigilance = *Minimal Clearly Present Pronounced Extreme* **How much of the time in the past month have you felt that way?** *% of time* _____ **Did being especially alert or watchful start or get worse after (EVENT)?** *(Do you think it's related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite Probable Unlikely* ***Key rating dimensions = frequency / intensity of hypervigilance*** Moderate = some of the time (20-30%) / hypervigilance clearly present, e.g., watchful in public, heightened awareness of threat Severe = much of the time (50-60%) / pronounced hypervigilance, e.g., scans environment for danger, may have safety rituals, exaggerated concern for safety of self/family/home	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

18. (E4) Exaggerated startle response.

In the past month, have you had any <u>strong</u> <u>startle</u> reactions? **What kinds of things made you startle?** **How strong are these startle reactions?** *(How strong are they compared to how most people would respond? Do you do anything other people would notice?)* **How long does it take you to recover?** <u>Circle</u>: Startle = *Minimal Clearly Present Pronounced Extreme* **How often has this happened in the past month?** *# of times* _____ **Did these startle reactions start or get worse after (EVENT)?** *(Do you think they're related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite Probable Unlikely* ***Key rating dimensions = frequency / intensity of startle*** Moderate = at least 2 X month / startle clearly present, some difficulty recovering Severe = at least 2 X week / pronounced startle, sustained arousal, considerable difficulty recovering	**0 *Absent*** **1 *Mild / subthreshold*** **2 *Moderate / threshold*** **3 *Severe / markedly elevated*** **4 *Extreme / incapacitating***

19. (E5) Problems with concentration.

In the past month, have you had any <u>problems</u> with <u>concentration</u>? **Can you give me some examples?** **Are you able to concentrate if you really try?** <u>Circle</u>: Problem concentrating = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How much of the time in the past month have you had problems with concentration?** % *of time* _____ **Did these problems with concentration start or get worse after (EVENT)?** *(Do you think they're related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite* *Probable* *Unlikely* ***Key rating dimensions = frequency / intensity of concentration problems*** Moderate = some of the time (20-30%) / problem concentrating clearly present, some difficulty but can concentrate with effort Severe = much of the time (50-60%) / pronounced problem concentrating, considerable difficulty even with effort	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

20. (E6) Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).

In the past month, have you had any problems <u>falling</u> or <u>staying</u> asleep? **What kinds of problems?** *(How long does it take you to fall asleep? How often do you wake up in the night? Do you wake up earlier than you want to?)* **How many total hours do you sleep each night?** **How many hours do you think you should be sleeping?** <u>Circle</u>: Problem sleeping = *Minimal* *Clearly Present* *Pronounced* *Extreme* **How often in the past month have you had these sleep problems?** *# of times* _____ **Did these sleep problems start or get worse after (EVENT)?** *(Do you think they're related to [EVENT]? How so?)* <u>Circle</u>: Trauma-relatedness = *Definite* *Probable* *Unlikely* ***Key rating dimensions = frequency / intensity of sleep problems*** Moderate = at least 2 X month / sleep disturbance clearly present, clearly longer latency or clear difficulty staying asleep, 30-90 minutes loss of sleep Severe = at least 2 X week / pronounced sleep disturbance, considerably longer latency or marked difficulty staying asleep, 90 min to 3 hrs loss of sleep	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

Criterion F: Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.

21. Onset of symptoms

[If not clear:] **When did you first start having (PTSD SYMPTOMS) you've told me about?** *(How long after the trauma did they start? More than six months?)*	***Total # months delay in onset*** _____ ***With delayed onset (≥ 6 months)? NO YES***

22. Duration of symptoms

[If not clear:] **How long have these (PTSD SYMPTOMS) lasted altogether?**	***Total # months duration*** _____ ***Duration more than 1 month? NO YES***

Criterion G: The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

23. Subjective distress

Overall, in the past month, how much have you been bothered by these (PTSD SYMPTOMS) you've told me about? [Consider distress reported on earlier items]	**0** ***None*** **1** ***Mild, minimal distress*** **2** ***Moderate, distress clearly present but still manageable*** **3** ***Severe, considerable distress*** **4** ***Extreme, incapacitating distress***

24. Impairment in social functioning

In the past month, have these (PTSD SYMPTOMS) affected your relationships with other people? How so? [Consider impairment in social functioning reported on earlier items]	**0** ***No adverse impact*** **1** ***Mild impact, minimal impairment in social functioning*** **2** ***Moderate impact, definite impairment but many aspects of social functioning still intact*** **3** ***Severe impact, marked impairment, few aspects of social functioning still intact*** **4** ***Extreme impact, little or no social functioning***

25. Impairment in occupational or other important area of functioning

[If not clear:] **Are you working now?** [If yes:] **In the past month, have these (PTSD SYMPTOMS) affected your work or your ability to work? How so?** [Consider reported work history, including number and duration of jobs, as well as the quality of work relationships. If premorbid functioning is unclear, inquire about work experiences before the trauma. For child/adolescent trauma, assess pre-trauma school performance and possible presence of behavior problems] [If no:] **Have these (PTSD SYMPTOMS) affected any other important part of your life?** [As appropriate, suggest examples such as parenting, housework, schoolwork, volunteer work, etc.] **How so?**	**0** ***No adverse impact*** **1** ***Mild impact, minimal impairment in occupational/other important functioning*** **2** ***Moderate impact, definite impairment but many aspects of occupational/other important functioning still intact*** **3** ***Severe impact, marked impairment, few aspects of occupational/other important functioning still intact*** **4** ***Extreme impact, little or no occupational/other important functioning***

Global Ratings

26. Global validity

Estimate the overall validity of responses. Consider factors such as compliance with the interview, mental status (e.g., problems with concentration, comprehension of items, dissociation), and evidence of efforts to exaggerate or minimize symptoms.	**0** ***Excellent, no reason to suspect invalid responses*** **1** ***Good, factors present that may adversely affect validity*** **2** ***Fair, factors present that definitely reduce validity*** **3** ***Poor, substantially reduced validity*** **4** ***Invalid responses, severely impaired mental status or possible deliberate "faking bad" or "faking good"***

27. Global severity

Estimate the overall severity of PTSD symptoms. Consider degree of subjective distress, degree of functional impairment, observations of behaviors in interview, and judgment regarding reporting style.	**0** ***No clinically significant symptoms, no distress and no functional impairment*** **1** ***Mild, minimal distress or functional impairment*** **2** ***Moderate, definite distress or functional impairment but functions satisfactorily with effort*** **3** ***Severe, considerable distress or functional impairment, limited functioning even with effort*** **4** ***Extreme, marked distress or marked impairment in two or more major areas of functioning***

28. Global improvement

Rate total overall improvement since the previous rating. Rate the degree of change, whether or not, in your judgment, it is due to treatment.	**0** ***Asymptomatic*** **1** ***Considerable improvement*** **2** ***Moderate improvement*** **3** ***Slight improvement*** **4** ***No improvement*** **5** ***Insufficient information***

Specify whether with dissociative symptoms: The individual's symptoms meet the criteria for posttraumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

29. (1) Depersonalization: Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).

In the past month, have there been times when you felt as if you were separated from yourself, like you were watching yourself from the outside or observing your thoughts and feelings as if you were another person?

[If no:] ***(What about feeling as if you were in a dream, even though you were awake? Feeling as if something about you wasn't real? Feeling as if time was moving more slowly?)***

Tell me more about that.

How strong is this feeling? *(Do you lose track of where you actually are or what's actually going on?)*

What do you do while this is happening? *(Do other people notice your behavior? What do they say?)*

How long does it last?

Circle: Dissociation = *Minimal* *Clearly Present* *Pronounced* *Extreme*

[If not clear:] ***(Was this due to the effects of alcohol or drugs? What about a medical condition like seizures?)*** [Rate 0=Absent if due to the effects of a substance or another medical condition]

How often has this happened in the past month? *# of times* _____

Key rating dimensions = frequency / intensity of dissociation
Moderate = at least 2 X month / dissociative quality clearly present but transient, retains some realistic sense of self and awareness of environment
Severe = at least 2 X week / pronounced dissociative quality, marked sense of detachment and unreality

0 ***Absent***

1 ***Mild / subthreshold***

2 ***Moderate / threshold***

3 ***Severe / markedly elevated***

4 ***Extreme / incapacitating***

30. (2) Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).

In the past month, have there been times when things going on around you seemed unreal or very strange and unfamiliar? [If no:] ***(Do things going on around you seem like a dream or like a scene from a movie? Do they seem distant or distorted?)*** **Tell me more about that.** **How strong is this feeling?** *(Do you lose track of where you actually are or what's actually going on?)* **What do you do while this is happening?** *(Do other people notice your behavior? What do they say?)* **How long does it last?** Circle: Dissociation = *Minimal Clearly Present Pronounced Extreme* [If not clear:] ***(Was this due to the effects of alcohol or drugs? What about a medical condition like seizures?)*** [Rate 0=Absent if due to the effects of a substance or another medical condition] **How often has this happened in the past month?** *# of times* _____ ***Key rating dimensions = frequency / intensity of dissociation*** Moderate = at least 2 X month / dissociative quality clearly present but transient, retains some realistic sense of environment Severe = at least 2 X week / pronounced dissociative quality, marked sense of unreality	**0** ***Absent*** **1** ***Mild / subthreshold*** **2** ***Moderate / threshold*** **3** ***Severe / markedly elevated*** **4** ***Extreme / incapacitating***

CAPS-5 SUMMARY SHEET

Name:_____ ID#:_____ Interviewer:_____ Study:_____ Date:_____

A. Exposure to actual or threatened death, serious injury, or sexual violence	
Criterion A met?	**0 = NO 1 = YES**

B. Intrusion symptoms (need 1 for diagnosis)	*Past Month*	
	Sev	***Sx (Sev ≥ 2)?***
(1) B1 – Intrusive memories		**0 = NO 1 = YES**
(2) B2 – Distressing dreams		**0 = NO 1 = YES**
(3) B3 – Dissociative reactions		**0 = NO 1 = YES**
(4) B4 – Cued psychological distress		**0 = NO 1 = YES**
(5) B5 – Cued physiological reactions		**0 = NO 1 = YES**
B subtotals	***B Sev =***	***# B Sx =***

C. Avoidance symptoms (need 1 for diagnosis)	*Past Month*	
	Sev	***Sx (Sev ≥ 2)?***
(6) C1 – Avoidance of memories, thoughts, feelings		**0 = NO 1 = YES**
(7) C2 – Avoidance of external reminders		**0 = NO 1 = YES**
C subtotals	***C Sev =***	***# C Sx =***

D. Cognitions and mood symptoms (need 2 for diagnosis)	*Past Month*	
	Sev	***Sx (Sev ≥ 2)?***
(8) D1 – Inability to recall important aspect of event		**0 = NO 1 = YES**
(9) D2 – Exaggerated negative beliefs or expectations		**0 = NO 1 = YES**
(10) D3 – Distorted cognitions leading to blame		**0 = NO 1 = YES**
(11) D4 – Persistent negative emotional state		**0 = NO 1 = YES**
(12) D5 – Diminished interest or participation in activities		**0 = NO 1 = YES**
(13) D6 – Detachment or estrangement from others		**0 = NO 1 = YES**
(14) D7 – Persistent inability to experience positive emotions		**0 = NO 1 = YES**
D subtotals	***D Sev =***	***# D Sx =***

E. Arousal and reactivity symptoms (need 2 for diagnosis)	*Past Month*	
	Sev	***Sx (Sev ≥ 2)?***
(15) E1 – Irritable behavior and angry outbursts		**0 = NO 1 = YES**
(16) E2 – Reckless or self-destructive behavior		**0 = NO 1 = YES**
(17) E3 – Hypervigilance		**0 = NO 1 = YES**
(18) E4 – Exaggerated startle response		**0 = NO 1 = YES**
(19) E5 – Problems with concentration		**0 = NO 1 = YES**
(20) E6 – Sleep disturbance		**0 = NO 1 = YES**
E subtotals	***E Sev =***	***# E Sx =***

PTSD totals	*Past Month*	
	Total Sev	*Total # Sx*
Sum of subtotals (B+C+D+E)		

F. Duration of disturbance	*Current*
(22) Duration of disturbance ≥ 1 month?	**0 = NO 1 = YES**

G. Distress or impairment (need 1 for diagnosis)	*Past Month*	
	Sev	*Cx (Sev ≥ 2)?*
(23) Subjective distress		**0 = NO 1 = YES**
(24) Impairment in social functioning		**0 = NO 1 = YES**
(25) Impairment in occupational functioning		**0 = NO 1 = YES**
G subtotals	*G Sev =*	*# G Cx =*

Global ratings	*Past Month*
(26) Global validity	
(27) Global severity	
(28) Global improvement	

Dissociative symptoms (need 1 for subtype)	*Past Month*	
	Sev	*Sx (Sev ≥ 2)?*
(29) 1 -- Depersonalization		**0 = NO 1 = YES**
(30) 2 – Derealization		**0 = NO 1 = YES**
Dissociative subtotals	*Diss Sev =*	*# Diss Sx =*

PTSD diagnosis	*Past Month*
PTSD PRESENT – ALL CRITERIA (A-G) MET?	**0 = NO 1 = YES**
With dissociative symptoms	**0 = NO 1 = YES**
(21) With delayed onset (≥ 6 months)	**0 = NO 1 = YES**

Connor-Davidson Resilience Scale (CD-RISC)

Participant ID

_____

Connor-Davidson Resilience Scale (CD-RISC)

For each item, please select the response that best indicates how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

	Not true at all (0)	Rarely true (1)	Sometimes true (2)	Often true (3)	True nearly all the time (4)
1. I am able to adapt when changes occur.	○	○	○	○	○
2. I have at least one close and secure relationship that helps me when I am stressed.	○	○	○	○	○
3. When there are no clear solutions to my problems, sometimes fate or God can help.	○	○	○	○	○
4. CI can deal with whatever comes my way.	○	○	○	○	○
5. Past successes give me confidence in dealing with new challenges and difficulties.	○	○	○	○	○
6. I try to see the humorous side of things when I am faced with problems.	○	○	○	○	○
7. Having to cope with stress can make me stronger.	○	○	○	○	○
8. I tend to bounce back after illness, injury, or other hardships.	○	○	○	○	○
9. Good or bad, I believe that most things happen for a reason.	○	○	○	○	○
10. I give my best effort no matter what the outcome may be.	○	○	○	○	○
11. I believe I can achieve my goals, even if there are obstacles.	○	○	○	○	○
12. Even when things look hopeless, I don't give up.	○	○	○	○	○
13. During times of stress/crisis, I know where to turn for help.	○	○	○	○	○
	Not true at all (0)	Rarely true (1)	Sometimes true (2)	Often true (3)	True nearly all the time (4)

14. Under pressure, I stay focused and think clearly.	○	○	○	○	○
15. I prefer to take the lead in solving problems rather than letting others make all the decisions.	○	○	○	○	○
16. I am not easily discouraged by failure.	○	○	○	○	○
17. I think of myself as a strong person when dealing with life's challenges and difficulties.	○	○	○	○	○
18. I can make unpopular or difficult decisions that affect other people, if it is necessary.	○	○	○	○	○
19. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	○	○	○	○	○
20. In dealing with life's problems, sometimes you have to act on a hunch without knowing why.	○	○	○	○	○
21. I have a strong sense of purpose in my life.	○	○	○	○	○
22. I feel in control of my life.	○	○	○	○	○
23. I like challenges.	○	○	○	○	○
24. I work to attain my goals no matter what roadblocks I encounter along the way.	○	○	○	○	○
25. I take pride in my achievements.	○	○	○	○	○

Combat Exposure Scale (CES)

Participant ID

_____

Combat Exposure Scale (CES)

Please circle the number above the answer that best describes your experience

1. Did you ever go on combat patrols or have other dangerous duty?

◯ No (1) ◯ 1-3 times (2) ◯ 4-12 times (3) ◯ 13-50 times (4) ◯ 51+ times (5)

2. Were you ever under enemy fire?

◯ Never (1) ◯ Less than 1 month (2) ◯ 1-3 months (3) ◯ 4-6 months (4) ◯ 7 months or more (5)

3. Were you ever under enemy fire?

◯ No (1) ◯ 1-2 times (2) ◯ 3-12 times (3) ◯ 13-25 times (4) ◯ 26+ times (5)

4. What percentage of soldiers in your unit were killed (KIA), wounded or missing in action (MIA)?

◯ None (1) ◯ 1-25% (2) ◯ 26-50% (3) ◯ 51-75% (4) ◯ 76% or more (5)

5. How often did you fire rounds at the enemy?

◯ Never (1) ◯ 1-2 times (2) ◯ 3-12 times (3) ◯ 13-50 times (4) ◯ 51+ times (5)

6. How often did you see someone hit by incoming or outgoing rounds?

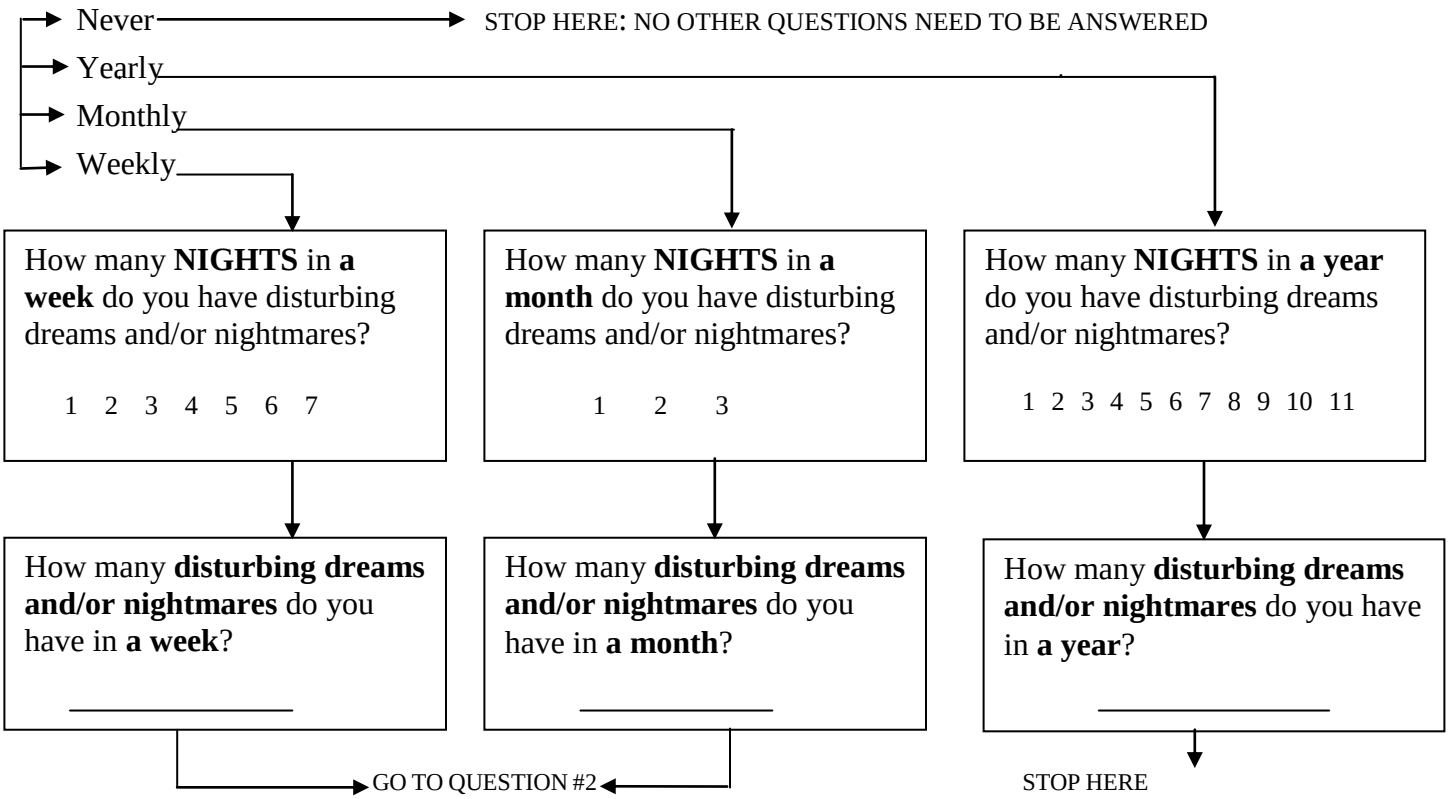
◯ Never (1) ◯ 1-2 times (2) ◯ 3-12 times (3) ◯ 13-50 times (4) ◯ 51+ times (5)

7. How often were you in danger of being injured or killed (i.e., being pinned down, overrun, ambushed, near miss, etc.)?

◯ Never (1) ◯ 1-2 times (2) ◯ 3-12 times (3) ◯ 13-50 times (4) ◯ 51+ times (5)

Disturbing Dream and Nightmare Severity Index

1. How often do you have disturbing dreams and/or nightmares: (Circle one, then follow the arrow)



2. Please estimate the NUMBER of months or years you have had disturbing dreams and/or nightmares:

_____months _____years

3. On average, do your nightmares wake you up? (Circle answer)

Never/Rarely Occasionally Sometimes Frequently Always

4. How would you rate the SEVERITY of your disturbing dreams and/or nightmare problem? (Circle answer)

No Problem	Minimal Problem	Mild Problem	Moderate Problem	Severe Problem	Very Severe Problem	Extremely Severe Problem

5. How would you rate the INTENSITY of your disturbing dreams and/or nightmares? (Circle answer)

Not Intense	Minimal Intensity	Mild Intensity	Moderate Intensity	Severe Intensity	Very Severe Intensity	Extremely Severe Intensity

Initials_____

Disturbing Dream and Nightmare Severity Index (cont.)

6. My disturbing dreams or nightmares cause me to lose sleep:

   Not at All Slightly Moderately Very Much A Great Deal

7. My disturbing dreams or nightmares make it difficult to fall asleep:

   Not at All Slightly Moderately Very Much A Great Deal

8. My disturbing dreams or nightmares interfere with the quality of my sleep:

   Not at All Slightly Moderately Very Much A Great Deal

9. My disturbing dreams or nightmares make it difficult to sleep through the night:

   Not at All Slightly Moderately Very Much A Great Deal

10. My disturbing dreams or nightmares interfere with my mood:

    Not at All Slightly Moderately Very Much A Great Deal

11. My disturbing dreams or nightmares interfere with my mental health:

    Not at All Slightly Moderately Very Much A Great Deal

12. My disturbing dreams or nightmares interfere with my physical health:

    Not at All Slightly Moderately Very Much A Great Deal

13. My disturbing dreams or nightmares interfere with social or recreational activities:

    Not at All Slightly Moderately Very Much A Great Deal

14. My disturbing dreams or nightmares interfere with my school or work performance:

    Not at All Slightly Moderately Very Much A Great Deal

15. My disturbing dreams or nightmares interfere with my relationships:

    Not at All Slightly Moderately Very Much A Great Deal

Initials_____

DSIQ

Day of Scan Information Questionnaire (DSIQ)

Date _____

Weight _____
(Pounds)

Caffeine Use

Did you have any caffeine containing products today?

◯ Yes ◯ No

How many?

_____

On average, how many cups of caffeinated coffee do you drink per day?

_____

On average, how many cups of caffeinated tea do you drink per day?

_____

On average, how many bottles/cans of caffeinated soda do you drink per day?

_____

On average, how many energy drinks do you drink per day?

_____

What brand(s) do you drink?

_____

Do you use any other caffeinated products, such as Vivarin or NoDoz?

◯ Yes ◯ No

What product(s)?

_____

How much?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. tablets))

How often?

◯ Day
◯ Week
◯ Month

Nicotine Use

Do you smoke cigarettes?

◯ Yes ◯ No

About how many cigarettes do you smoke per day?

_____

How long have you been smoking?

_____
(Years)

Have you tried to quit?

◯ Yes ◯ No

How many times?

_____

Did you ever smoke cigarettes in the past?

◯ Yes ◯ No

How many cigarettes did you smoke per day?

_____

How many years ago did you start smoking?

_____

How many years ago did you quit?

_____

Do you use smokeless tobacco, such as dip or chew?

◯ Yes ◯ No

About how much do you use per day?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. pouches))

Did you ever use smokeless tobacco in the past?

◯ Yes ◯ No

How much did you use per day?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. pouches))

How many years ago did you start using smokeless tobacco?

_____

How many years ago did you quit?

_____

Do you use any other nicotine-containing products?

◯ Yes ◯ No

What product(s)?

_____

How much?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. lozenges))

How often?

◯ Day
◯ Week
◯ Month

Other

Do you take diet pills?

◯ Yes ◯ No

What brand(s)?

_____

How many?

_____

How often?

◯ Day
◯ Week
◯ Month

Are you currently taking any medications, vitamins, or supplements?

◯ Yes ◯ No

List medication

_____
((e.g. Ibuprofen, 200 mg, Daily))

List medication

_____

List medication

_____

List medication

_____

How many times per month do you drink (alcohol)?

_____

On those occasions, what is the average number of drinks you consume?

_____

On those occasions, what is the largest number of drinks you consume?

_____

How many times in the past year have you used marijuana?

_____

Have you ever used marijuana at other times in your life?

◯ Yes ◯ No

At what age did you begin smoking marijuana?

_____

On approximately how many occasions have you used marijuana?

_____

Do you use any other street drugs currently or in the past year?

◯ Yes ◯ No

Which drug(s)?

_____

How much?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. pills))

How often?

◯ Day
◯ Week
◯ Month

Physical Information

When was your last menstrual period (be as precise as possible)?

_____
(Date of period: _____ or about _____ days ago)

Do you typically eat breakfast?

◯ Yes ◯ No

Do you eat of snack within 1 hour of waking up?

◯ Yes ◯ No

Do you typically eat or snack within 1 hour of falling asleep at night?

◯ Yes ◯ No

Thinking about the past four weeks, on average, how many meals do you have per day?

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6 or more

Thinking about the past four weeks, on average, how many times do you snack per day?

◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 or more

How has your appetite been over the past four weeks on average?

◯ 1 (Never hungry)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always hungry)

Do you feel that you eat more than you intend to?

◯ 1 (Never)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

How much do you think you can eat, compared to others your age?

◯ 1 (Much less than others)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Much more than others)

When hungry, how much do you crave carbohydrates (e.g. rice, breads, pastas)?

◯ 1 (Not at all)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

When hungry, how much do you crave fats (e.g. fried food, red meats, cheese/cream, chips)?

◯ 1 (Not at all)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

When hungry, how much do you crave sweets?

◯ 1 (Not at all)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

Thinking about the past four weeks, on average, how many servings of fruit and vegetables do you have per day?
(1 Serving = 1/2 cup of raw fruit/vegetables, 1 apple/banana, etc.)

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 or more

Thinking about the past four weeks, on average, how many servings of meat, poultry, fish, beans, eggs, and nuts do you have per day?
(1 Serving = 3 oz. meat/poultry/fish, 1/2 cup beans, 2 tbsp. peanut butter, etc.)

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 or more

Thinking about the past four weeks, on average, how many times a week do you have microwave meals or eat fast food?

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 or more

Do you engage in regular exercise?

◯ Yes ◯ No

Thinking about the past four weeks, on average, how many days per week do you exercise?

◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7

Thinking about the past four weeks, on average, how many minutes is each exercise session?

_____
(Minutes)

What percent of your exercise is cardio?

_____
(Percent (%))

What percent of your exercise is strength training?

_____
(Percent (%))

What percent of your exercise is light exercise (e.g. stretching, walking, and some types of yoga)?

_____
(Percent (%))

Sleep Habits

How many hours of sleep did you get last night?

_____
((e.g. 7.5 for 7 hours 30 minutes of sleep))

Keeping the past four weeks in mind, how many hours do you typically sleep on weeknights (Sun-Thurs)?

_____

Keeping the past four weeks in mind, how many hours do you typically sleep on weekend nights (Fri-Sat)?

_____

Keeping the past four weeks in mind, at what time do you normally go to bed at night on weeknights (Sun-Thurs)?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

Keeping the past four weeks in mind, at what time do you normally go to bed at night on weekends (Fri-Sat)?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

Keeping the past four weeks in mind, at what time do you typically awaken on weekdays (Mon-Fri)?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

Keeping the past four weeks in mind, at what time do you typically awaken on weekends (Sat-Sun)?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

Keeping the past four weeks in mind, how many minutes does it typically take to fall asleep at night on weeknights (Sun-Thurs)?

_____
((e.g. 15 for 15 minutes))

Keeping the past four weeks in mind, how many minutes does it typically take you to fall asleep at night on weekends (Fri-Sat)?

_____

At what time of day do you feel sleepiest?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

At what time of day do you feel most alert?

_____
(In standard time HH:MM)

AM or PM?

◯ AM ◯ PM

How many hours do you need to sleep per night to feel your best?

_____

"If I get less than _____ hours of sleep, I notice an impairment in my ability to function at work."

_____

"If I get more than _____ hours of sleep, I notice an impairment in my ability to function at work."

_____

Is daytime sleepiness currently a problem for you?

◯ Yes ◯ No

Are you currently doing shift work, that is, working early morning, evening, or night shifts?

◯ Yes ◯ No

Do you ever have trouble falling asleep?

◯ Yes ◯ No

How often per week, month, or year?

_____
((Designate time period in the next question))

Specify time period

◯ Week
◯ Month
◯ Year

Do you ever have trouble staying asleep?

◯ Yes ◯ No

How often per week, month, or year?

_____
((Designate time period in the next question))

Specify time period

◯ Week
◯ Month
◯ Year

Do you take more than two daytime naps per month?

◯ Yes ◯ No

About how many times per week do you nap?

_____

At what time of day do you normally begin your nap?

_____
(HH:MM)

AM or PM?

◯ AM
◯ PM

At what time of day do you normally wake up from your nap?

_____
(HH:MM)

AM or PM?

◯ AM
◯ PM

Do you consider yourself a light, normal, or heavy sleeper?

◯ Light
◯ Normal
◯ Heavy

I yawn often

◯ 1 (Never) ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ 8 ◯ 9 ◯ 10 (Always yawning)

When I see or hear someone else yawn, I will yawn too

◯ 1 (Never)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Every time)

Recent Risk of Dozing Off (ESS)

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling tired? This refers to your usual way of life in the last two weeks. Even if you have not done some of these things recently, try to work out how they would have affected you. Use the following scale to choose the most appropriate number for each situation.

0 - Would never doze
1 - Slight chance of dozing
2 - Moderate chance of dozing
3 - High chance of dozing

	Would never doze (0)	Slight chance of dozing (1)	Moderate chance of dozing (2)	High chance of dozing (3)
1. Sitting and reading	◯	◯	◯	◯
2. Watching TV	◯	◯	◯	◯
3. Sitting, inactive in a public place (e.g. a theater or meeting)	◯	◯	◯	◯
4. As a passenger in a car for an hour without a break	◯	◯	◯	◯
5. Lying down to rest in the afternoon when circumstances permit	◯	◯	◯	◯
6. Sitting and talking to someone	◯	◯	◯	◯
7. Sitting quietly after a lunch without alcohol	◯	◯	◯	◯
8. In a car, while stopped for a few minutes in traffic	◯	◯	◯	◯

Source: Johns MW. A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale. Sleep 1991; 14(6): 540-5.

DSIQ

Day of Scan Information Questionnaire (DSIQ)

Date _____

Date of Birth _____
(in M-D-Y format)

Height _____
(Inches (4 feet = 48 inches, 5 feet = 60 inches, 6 feet = 72 inches))

Weight _____
(Pounds)

Sex

◯ Male
◯ Female

What is the highest grade or level of school that you have completed or the highest degree you have obtained?

◯ Less than 9th grade
◯ Some high school, no diploma
◯ High school graduate, or equivalent
◯ Some college, no degree
◯ Technical/Vocational degree
◯ Associate degree
◯ Bachelor's degree
◯ Master's degree
◯ Doctorate degree

With what ethnicity do you identify?

◯ White
◯ Hispanic/Latino
◯ Black/African-American
◯ Native-American/American Indian
◯ Asian/Pacific Islander
◯ Other

What is your eye color?

◯ Blue

◯ Brown

◯ Hazel

◯ Green

◯ Other: _____

Caffeine Use

Did you have any caffeine containing products today?

◯ Yes ◯ No

How many?

_____

On average, how many cups of caffeinated coffee do you drink per day?

_____

On average, how many cups of caffeinated tea do you drink per day?

_____

On average, how many bottles/cans of caffeinated soda do you drink per day?

On average, how many energy drinks do you drink per day?

_____

What brand(s) do you drink?

_____

Do you use any other caffeinated products, such as Vivarin or NoDoz?

◯ Yes ◯ No

What product(s)?

_____

How much?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. tablets))

How often?

◯ Day
◯ Week
◯ Month

Nicotine Use

Do you smoke cigarettes?

◯ Yes ◯ No

About how many cigarettes do you smoke per day?

_____

How long have you been smoking?

_____
(Years)

Have you tried to quit?

◯ Yes ◯ No

How many times?

_____

Did you ever smoke cigarettes in the past?

◯ Yes ◯ No

How many cigarettes did you smoke per day?

_____

How many years ago did you start smoking?

_____

How many years ago did you quit?

_____

Do you use smokeless tobacco, such as dip or chew?

◯ Yes ◯ No

About how much do you use per day?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. pouches))

Did you ever use smokeless tobacco in the past?

◯ Yes ◯ No

How much did you use per day?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. pouches))

How many years ago did you start using smokeless tobacco?

_____

How many years ago did you quit?

_____

Do you use any other nicotine-containing products?

◯ Yes ◯ No

What product(s)?

_____

How much?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. lozenges))

How often?

◯ Day
◯ Week
◯ Month

Other

Do you take diet pills?

◯ Yes ◯ No

What brand(s)?

_____

How many?

_____

How often?

◯ Day
◯ Week
◯ Month

Are you currently taking any medications, vitamins, or supplements?

◯ Yes ◯ No

List medication

_____
((e.g. Ibuprofen, 200 mg, Daily))

List medication

_____

List medication

_____

List medication

_____

How many times per month do you drink (alcohol)?

_____

On those occasions, what is the average number of drinks you consume?

_____

On those occasions, what is the largest number of drinks you consume?

_____

How many times in the past year have you used marijuana?

_____

Have you ever used marijuana at other times in your life?

◯ Yes ◯ No

At what age did you begin smoking marijuana?

_____

On approximately how many occasions have you used marijuana?

Do you use any other street drugs currently or in the past year?

◯ Yes ◯ No

Which drug(s)?

_____

How much?

_____
((Designate mode of consumption in the next question))

Mode of consumption

_____
((e.g. pills))

How often?

◯ Day
◯ Week
◯ Month

Physical Information

When was your last menstrual period (be as precise as possible)?

_____
(Date of period:_____or about_____days ago)

Do you typically eat breakfast?

◯ Yes ◯ No

Do you eat of snack within 1 hour of waking up?

◯ Yes ◯ No

Do you typically eat or snack within 1 hour of falling asleep at night?

◯ Yes ◯ No

Thinking about the past four weeks, on average, how many meals do you have per day?

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6 or more

Thinking about the past four weeks, on average, how many times do you snack per day?

◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 or more

◯ 1 (Never hungry)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always hungry)

Do you feel that you eat more than you intend to?

◯ 1 (Never)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

How much do you think you can eat, compared to others your age?

◯ 1 (Much less than others)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Much more than others)

When hungry, how much do you crave carbohydrates (e.g. rice, breads, pastas)?

◯ 1 (Not at all)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

When hungry, how much do you crave fats (e.g. fried food, red meats, cheese/cream, chips)?

◯ 1 (Not at all)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

◯ 1 (Not at all)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Always)

Thinking about the past four weeks, on average, how many servings of fruit and vegetables do you have per day?
(1 Serving = 1/2 cup of raw fruit/vegetables, 1 apple/banana, etc.)

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 or more

Thinking about the past four weeks, on average, how many servings of meat, poultry, fish, beans, eggs, and nuts do you have per day?
(1 Serving = 3 oz. meat/poultry/fish, 1/2 cup beans, 2 tbsp. peanut butter, etc.)

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 or more

Thinking about the past four weeks, on average, how many times a week do you have microwave meals or eat fast food?

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 or more

Do you engage in regular exercise?

◯ Yes ◯ No

◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7

Thinking about the past four weeks, on average, how many minutes is each exercise session?

_____
(Minutes)

What percent of your exercise is cardio?

_____
(Percent (%))

What percent of your exercise is strength training?

_____
(Percent (%))

What percent of your exercise is light exercise (e.g. stretching, walking, and some types of yoga)?

_____
(Percent (%))

Sleep Habits

How many hours of sleep did you get last night?

_____
((e.g. 7.5 for 7 hours 30 minutes of sleep))

Keeping the past four weeks in mind, how many hours do you typically sleep on weeknights (Sun-Thurs)?

_____

Keeping the past four weeks in mind, how many hours do you typically sleep on weekend nights (Fri-Sat)?

_____

Keeping the past four weeks in mind, at what time do you normally go to bed at night on weeknights (Sun-Thurs)?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

Keeping the past four weeks in mind, at what time do you normally go to bed at night on weekends (Fri-Sat)?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

Keeping the past four weeks in mind, at what time do you typically awaken on weekends (Sat-Sun)?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

Keeping the past four weeks in mind, how many minutes does it typically take to fall asleep at night on weeknights (Sun-Thurs)?

_____
((e.g. 15 for 15 minutes))

Keeping the past four weeks in mind, how many minutes does it typically take you to fall asleep at night on weekends (Fri-Sat)?

_____

At what time of day do you feel sleepiest?

_____
(In standard time HH:MM)

AM or PM?

◯ AM
◯ PM

At what time of day do you feel most alert?

_____
(In standard time HH:MM)

AM or PM?

◯ AM ◯ PM

How many hours do you need to sleep per night to feel your best?

_____

"If I get less than_____hours of sleep, I notice an impairment in my ability to function at work."

_____

"If I get more than_____hours of sleep, I notice an impairment in my ability to function at work."

_____

Is daytime sleepiness currently a problem for you?

◯ Yes ◯ No

◯ Yes ◯ No

Do you ever have trouble falling asleep?

◯ Yes ◯ No

How often per week, month, or year?

_____
((Designate time period in the next question))

Specify time period

◯ Week
◯ Month
◯ Year

Do you ever have trouble staying asleep?

◯ Yes ◯ No

How often per week, month, or year?

_____
((Designate time period in the next question))

Specify time period

◯ Week
◯ Month
◯ Year

Do you take more than two daytime naps per month?

◯ Yes ◯ No

About how many times per week do you nap?

_____

At what time of day do you normally begin your nap?

_____
(HH:MM)

AM or PM?

◯ AM
◯ PM

At what time of day do you normally wake up from your nap?

_____
(HH:MM)

AM or PM?

◯ AM
◯ PM

◯ Light
◯ Normal
◯ Heavy

I yawn often

◯ 1 (Never) ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ 8 ◯ 9 ◯ 10 (Always yawning)

When I see or hear someone else yawn, I will yawn too

◯ 1 (Never)
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ 8
◯ 9
◯ 10 (Every time)

Recent Risk of Dozing Off (ESS)

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling tired? This refers to your usual way of life in the last two weeks. Even if you have not done some of these things recently, try to work out how they would have affected you. Use the following scale to choose the most appropriate number for each situation.

0 - Would never doze
1 - Slight chance of dozing
2 - Moderate chance of dozing
3 - High chance of dozing

	Would never doze (0)	Slight chance of dozing (1)	Moderate chance of dozing (2)	High chance of dozing (3)
1. Sitting and reading	◯	◯	◯	◯
2. Watching TV	◯	◯	◯	◯
3. Sitting, inactive in a public place (e.g. a theater or meeting)	◯	◯	◯	◯
4. As a passenger in a car for an hour without a break	◯	◯	◯	◯
5. Lying down to rest in the afternoon when circumstances permit	◯	◯	◯	◯
6. Sitting and talking to someone	◯	◯	◯	◯
7. Sitting quietly after a lunch without alcohol	◯	◯	◯	◯
8. In a car, while stopped for a few minutes in traffic	◯	◯	◯	◯

Source: Johns MW. A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale. Sleep 1991; 14(6): 540-5.

Edinburgh Handedness Inventory (EHI)

Participant ID

_____

Edinburgh Handedness Inventory (EHI)

Please mark the box that best describes which hand you use for the activity in question

	Always left (1)	Usually left (2)	No preference (3)	Usually right (4)	Always right (5)
1. Writing	◯	◯	◯	◯	◯
2. Throwing	◯	◯	◯	◯	◯
3. Scissors	◯	◯	◯	◯	◯
4. Toothbrush	◯	◯	◯	◯	◯
5. Knife (without fork)	◯	◯	◯	◯	◯
6. Spoon	◯	◯	◯	◯	◯
7. Match (when striking)	◯	◯	◯	◯	◯
8. Computer mouse	◯	◯	◯	◯	◯

Evaluation of Risks Scale (EVAR)

Participant ID

_____

Evaluation of Risks Scale (EVAR)

1. I feel like gambling

_____

2. I am driving and the light turns yellow, I feel like

_____

3. The lights suddenly go out in an unfamiliar stairwell

_____

4. I feel like

_____

5. I feel like diving from a diving board, which is

_____

6. I like

_____

7. I seek

_____

8. I am in a hurry

_____

9. I am open to

_____

10. I prefer to

_____

11. I give priority to

_____

12. I like to listen to music

_____

13. I am sure of myself

_____

14. I prefer discussions, which are

_____

15. A hostile situation

_____

16. A menacing dog approaches

_____

17. Faced with a potentially dangerous event

_____

18. Seeing a person who is drowning, I first

_____

19. I prefer work that is

_____

20. I am right

_____

21. I emphasize

_____

22. I like to drive

_____

23. I like to listen to music with a tempo that is

_____

24. I like to take risks

_____

Functional Outcome Of Sleep Questionnaire (FOSQ)

Functional Outcome of Sleep Questionnaire (FOSQ)

1) Subject ID _____

2) Date _____

Some people have difficulty performing everyday activities when they feel tired or sleepy. The purpose of this questionnaire is to find out if you generally have difficulty carrying out certain activities because you are too sleepy or tired. In this questionnaire, when the words "sleepy" or "tired" are used, it means the feeling that you can't keep your eyes open, your head is droopy, that you want to "nod off," or that you feel the urge to take a nap. These words do not refer to the tired or fatigued feeling you may have after you have exercised.

Please circle one answer for each question. Please try to be as accurate as possible.

0 - I don't do this for other reasons
1 - No difficulty
2 - Yes, a little difficulty
3 - Yes, moderate difficulty
4 - Yes, extreme difficulty

		I don't do this activity for other reasons (0)	No difficulty (1)	Yes, a little difficulty (2)	Yes, moderate difficulty (3)	Yes, extreme difficulty (4)
3)	1. Do you generally have difficulty concentrating on things you do because you are sleepy or tired?	○	○	○	○	○
4)	2. Do you generally have difficulty remembering things because you are sleepy or tired?	○	○	○	○	○
5)	3. Do you have difficulty finishing a meal because you become sleepy or tired?	○	○	○	○	○
6)	4. Do you have difficulty working on a hobby (for example: sewing, collecting, gardening) because you are sleepy or tired?	○	○	○	○	○
7)	5. Do you have difficulty doing work around the house (for example: cleaning house, doing laundry, taking out the trash, repair work) because you are sleepy or tired?	○	○	○	○	○
8)	6. Do you have difficulty operating a motor vehicle for short distances (less than 100 miles) because you become sleepy or tired?	○	○	○	○	○

9)

	7. Do you have difficulty operating a motor vehicle for long distances (greater than 100 miles) because you become sleepy or tired?	○	○	○	○	○
10)	8. Do you have difficulty getting things done because you are too sleepy or tired to drive or take public transportation?	○	○	○	○	○
11)	9. Do you have difficulty taking care of financial affairs and doing paperwork (for example: writing checks, paying bills, keeping financial records, filling out tax forms, etc.) because you are sleepy or tired?	○	○	○	○	○
12)	10. Do you have difficulty performing employed or volunteer work because you are sleepy or tired?	○	○	○	○	○
		I don't do this activity for other reasons (0)	No difficulty (1)	Yes, a little difficulty (2)	Yes, moderate difficulty (3)	Yes, extreme difficulty (4)
13)	11. Do you have difficulty maintaining a telephone conversation because you become sleepy or tired?	○	○	○	○	○
14)	12. Do you have difficulty visiting with your family or friends in your home because you become sleepy or tired?	○	○	○	○	○
15)	13. Do you have difficulty visiting with your family or friends in their homes because you become sleepy or tired?	○	○	○	○	○
16)	14. Do you have difficulty doing things for your family or friends because you become sleepy or tired?	○	○	○	○	○
17)	15. Has you relationship with family, friends or work colleagues been affected because you are sleepy or tired?	○	○	○	○	○
18)	16. Do you have difficulty exercising or participating in a sporting activity because you are too sleepy or tired?	○	○	○	○	○
19)	17. Do you have difficulty watching a movie or videotape because you become sleepy or tired?	○	○	○	○	○
20)						

	18. Do you have difficulty enjoying the theater or a lecture because you become sleepy or tired?	○	○	○	○	○
21)	19. Do you have difficulty enjoying a concert because you become sleepy or tired?	○	○	○	○	○
22)	20. Do you have difficulty watching television because you are sleepy or tired?	○	○	○	○	○
		I don't do this activity for other reasons (0)	No difficulty (1)	Yes, a little difficulty (2)	Yes, moderate difficulty (3)	Yes, extreme difficulty (4)
23)	21. Do you have difficulty participating in religious services, meetings or a group club because you are sleepy or tired?	○	○	○	○	○
24)	22. Do you have difficulty being as active as you want to be in the evening because you are sleepy or tired?	○	○	○	○	○
25)	23. Do you have difficulty being as active as you want to be in the morning because you are sleep or tired?	○	○	○	○	○
26)	24. Do you have difficulty being as active as you want to be in the afternoon because you are sleepy or tired?	○	○	○	○	○
27)	25. How would you rate yourself in your general level of activity?	○	○	○	○	○
		Very low (1)	Low (2)	Medium (3)	High (4)	
28)	26. How would you rate yourself in your general level of activity	○	○	○	○	
		I don't do this activity for other reasons (0)	No difficulty (1)	Yes, a little difficulty (2)	Yes, moderate difficulty (3)	Yes, extreme difficulty (4)
29)	27. Has your intimate or sexual relationship been affected because you are sleepy or tired?	○	○	○	○	○
30)	28. Has your desire for intimacy or sex been affected because you are sleepy or tired?	○	○	○	○	○
31)	29. Has your ability to become sexually aroused been affected because you are sleepy or tired?	○	○	○	○	○
32)						

30. Has your ability to have an orgasm been affected because you are sleepy or tired?	○	○	○	○	○

Source: Weaver, T.E., Laizner, A.M., Evans, L.K., Maislin, G., Chugh, D.K., Lyon, K., Smith, P.L., Schwartz, A.R., Redline, S., Pack, A.I., Dinges, D.F. School of Nursing, Philadelphia, Pennsylvania, USA. Sleep [1997, 20(10): 835-843]

Participant ID _____ **Date** _____

GQ-6

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

1 = strongly disagree
2 = disagree
3 = slightly disagree
4 = neutral
5 = slightly agree
6 = agree
7 = strongly agree

____1. I have so much in life to be thankful for.

____2. If I had to list everything that I felt grateful for, it would be a very long list.

____3. When I look at the world, I don't see much to be grateful for.

____4. I am grateful to a wide variety of people.

____5. As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.

____6. Long amounts of time can go by before I feel grateful to something or someone.

Insomnia Severity Index

The Insomnia Severity Index has seven questions. The seven answers are added up to get a total score. When you have your total score, look at the 'Guidelines for Scoring/Interpretation' below to see where your sleep difficulty fits.

For each question, please CIRCLE the number that best describes your answer.

Please rate the CURRENT (i.e. LAST 2 WEEKS) SEVERITY of your insomnia problem(s).

Insomnia Problem	None	Mild	Moderate	Severe	Very Severe
1. Difficulty falling asleep	0	1	2	3	4
2. Difficulty staying asleep	0	1	2	3	4
3. Problems waking up too early	0	1	2	3	4

4. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?

Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied
0	1	2	3	4

5. How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?

Not at all Noticeable	A Little	Somewhat	Much	Very Much Noticeable
0	1	2	3	4

6. How WORRIED/DISTRESSED are you about your current sleep problem?

Not at all Worried	A Little	Somewhat	Much	Very Much Worried
0	1	2	3	4

7. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?

Not at all Interfering	A Little	Somewhat	Much	Very Much Interfering
0	1	2	3	4

Guidelines for Scoring/Interpretation:

Add the scores for all seven items (questions 1 + 2 + 3 + 4 + 5 +6 + 7) = _____ your total score

Total score categories:
0–7 = No clinically significant insomnia
8–14 = Subthreshold insomnia
15–21 = Clinical insomnia (moderate severity)
22–28 = Clinical insomnia (severe)

Morningness-Eveningness Questionnaire (MEQ)

Participant ID

_____

Morningness-Eveningness Questionnaire (MEQ)

1. Considering only your own "feeling best" rhythm, at what time would you get up if you were entirely free to plan your day?

◯ 5:00 - 6:30 AM (1)
◯ 6:30 - 7:45 AM (2)
◯ 7:45 - 9:45 AM (3)
◯ 9:45 - 11:00 AM (4)
◯ 11:00 AM - 12:00 PM (5)

2. Considering only your own "feeling best" rhythm, at what time would you go to bed if you were entirely free to plan your evening?

◯ 8:00 - 9:00 PM (1)
◯ 9:00 - 10:15 PM (2)
◯ 10:15 PM - 12:30 AM (3)
◯ 12:30 - 1:45 AM (4)
◯ 1:45 - 3:00 AM (5)

3. If there is a specific time at which you would have to get up in the morning, to what extent are you dependent on being woken up by an alarm clock?

◯ Not at all dependent (1)
◯ Slightly dependent (2)
◯ Fairly dependent (3)
◯ Very dependent (4)

4. Assuming adequate environmental conditions, how easy do you find getting up in the mornings?

◯ Not at all easy (1)
◯ Not very easy (2)
◯ Fairly easy (3)
◯ Very easy (4)

5. How alert do you feel during the first half hour after having woken in the mornings?

◯ Not at all alert (1)
◯ Slightly alert (2)
◯ Fairly alert (3)
◯ Very alert (4)

6. How is your appetite during the first half-hour after having woken in the mornings?

◯ Very poor (1)
◯ Fairly poor (2)
◯ Fairly good (3)
◯ Very good (4)

7. During the first half-hour after having woken in the morning, how tired do you feel?

◯ Very tired (1)
◯ Fairly tired (2)
◯ Fairly refreshed (3)
◯ Very refreshed (4)

8. When you have no commitments the next day, at what time do you go to bed compared to your usual bedtime?

◯ Seldom or never later (1)
◯ Less than one hour later (2)
◯ 1-2 hours later (3)
◯ More than two hours later (4)

9. You have decided to engage in some physical exercise. A friend suggests that you do this one hour twice a week and the best time for him is between 7:00-8:00 AM. Bearing in mind nothing else but your own "feeling best" rhythm, how do you think you would perform?

◯ Would be in good form (1)
◯ Would be in reasonable form (2)
◯ Would find it difficult (3)
◯ Would find it very difficult (4)

10. At what time in the evening do you feel tired and as a result in need of sleep?

◯ 8:00 - 9:00 PM (1)
◯ 9:00 - 10:15 PM (2)
◯ 10:15 PM - 12:45 AM (3)
◯ 12:45 - 2:00 AM (4)
◯ 2:00 - 3:00 AM (5)

11. You wish to be at your peak performance for a test which you know if going to be mentally exhausting and lasting for two hours. You are entirely free to plan your day and considering only your own "feeling best" rhythm, which ONE of the four testing times would you choose?

◯ 8:00 - 10:00 AM (1)
◯ 11:00 AM - 1:00 PM (2)
◯ 3:00 - 5:00 PM (3)
◯ 7:00 - 9:00 PM (4)

12. If you went to bed at 11:00 PM, at what level of tiredness would you be?

◯ Not at all tired (1)
◯ A little tired (2)
◯ Fairly tired (3)
◯ Very tired (4)

13. For some reason, you have gone to bed several hours later than usual, but there is no need to get up at any particular time the next morning. Which ONE of the following events are you most likely to experience?

◯ Will wake up at usual time and will NOT fall asleep (1)
◯ Will wake up at usual time and will doze thereafter (2)
◯ Will wake up at usual time, but will fall asleep again (3)
◯ Will NOT wake up until later than usual (4)

14. One night, you have to remain awake between 4:00-6:00 AM in order to carry out a night watch. You have no commitments the next day. Which ONE of the following alternatives will suit you best?

◯ Would NOT go to bed until the watch was over (1)
◯ Would take a nap before and sleep after (2)
◯ Would take a good sleep before and nap after (3)
◯ Would take ALL sleep before watch (4)

15. You have to do two hours of hard physical work. You are entirely free to plan your day and considering only your own "feeling best" rhythm, which ONE of the following times would you choose?

◯ 8:00 - 10:00 AM (1)
◯ 11:00 AM - 1:00 PM (2)
◯ 3:00 - 5:00 PM (3)
◯ 7:00 - 9:00 PM (4)

16. You have decided to engage in hard physical exercise. A friend suggests that you do this for one hour twice a week and the best time for him is between 10:00-11:00 PM. Bearing in mind nothing else, but your own "feeling best" rhythm, how well do you think you would perform?

◯ Would be in good form (1)
◯ Would be in reasonable form (2)
◯ Would find it difficult (3)
◯ Would find it very difficult (4)

17. Suppose that you can choose your own work hours. Assume that you worked a FIVE-hour day (including breaks) and that your job was interesting and paid by results. During which time period would you want that five consecutive hours to END?

◯ 12:00 - 4:00 AM (1)
◯ 4:00 - 8:00 AM (2)
◯ 8:00 - 9:00 AM (3)
◯ 9:00 AM - 2:00 PM (4)
◯ 2:00 - 5:00 PM (5)
◯ 5:00 PM - 12:00 AM (6)

18. At what time of the day do you think that you reach your "feeling best" peak?

◯ 12:00 - 5:00 AM (1)
◯ 5:00 - 8:00 AM (2)
◯ 8:00 - 10:00 AM (3)
◯ 10:00 AM - 5:00 PM (4)
◯ 5:00 - 10:00 PM (5)
◯ 10:00 PM - 12:00 AM (6)

19. One hears about "morning" and "evening" types of people. Which ONE of these types do you consider yourself to be?

◯ Definitely a "morning" person (1)
◯ Rather more a "morning" person than an "evening type (2)
◯ Rather more an "evening" than a "morning" type (3)
◯ Definitely an "evening" type (4)

Have you ever used marijuana?

For our purposes, marijuana usage is considered any instance in which you intentionally consumed (smoked, ingested, etc.) any quantity of marijuana.

☐ **NO** ☐ **YES**

At what age did you start? _____

At what specific age (in years) was your marijuana usage the heaviest? _____

During your lifetime, approximately how many occasions have you used marijuana?

☐ 0-50 ☐ 51-100 ☐ 101-500 ☐ 501s-1000 ☐ 1001-5000 ☐ over 5000

Consider the extent of marijuana use throughout your lifetime. Please approximate the number of times per month on average which you used marijuana at the following ages:

16-18 years of age	19-21 years of age	22-24 years of age	25-27 years of age	28-30 years of age	30+ years of age

During your lifetime, on average, how many times per month have you used marijuana?

_____

In the past <u>four weeks</u>, did you use marijuana?

☐ **NO** ☐ **YES**

How often? _____ daily / weekly (*circle one*)

On average, how much do you consume per occasion? _____

If YES, please review the printed calendar reflecting all the days in the past month. Indicate the number of times you used marijuana on each of these days. If you abstained from marijuana use during a given day, please write a “0” on that day. Please fill out every day in the calendar with your best guess of marijuana use.

Appendix A. Nightmare Frequency Questionnaire

Subject #_____ Date _____

A.1. Frequency of nightmares and disturbing dreams

Part I: Frequency by number of nights.

Based on the previous three months, please estimate on *average* how often you experience nightmares and disturbing dreams by selecting *one* of the following categories based on *number of nights*.

Select only one column from the four listed, then circle only *one* category:

Zero	Yearly	Monthly	Weekly
0 nights	1 night per year	1 night per month	1 night per week
	2 per year (1 per 6 months)	2 nights per month	2 nights per week
	3 per year (1 per 4 months)	3 nights per month	3 nights per week
	4 per year (1 per 3 months)		4 nights per week
	5 per year		5 nights per week
	6 per year (1 per 2 months)		6 nights per week
	7 per year		7 nights per week
	8 per year		
	9 per year		
	10 per year		
	11 per year		

Part II: Frequency by actual number of nightmares and disturbing dreams.

Based on the previous three months, please estimate on *average* how often you experience nightmares and disturbing dreams by selecting *one* of the following categories based on the *actual number.*

Select only one column from the four listed, then circle only *one* category:

Zero	Yearly	Monthly	Weekly
0 nightmares	1 nightmare per year	1 nightmare/month	1 nightmare/week
	2 per year (1 per 6 months)	2 per month	2 per week
	3 per year (1 per 4 months)	3 per month	3 per week
	4 per year (1 per 3 months)		4 per week
	5 per year		5 per week
	6 per year (1 per 2 months)		6 per week
	7 per year		7 per week
	8 per year		__ per week[a]
	9 per year		
	10 per year		
	11 per year		

[a] If your total number of nightmares and disturbing dreams is more than 7 per week, please *estimate on average* the actual number for a typical week and *fill in the blank*. (For example, some people have *more* than one nightmare or disturbing dream in a single night. They may report 2 disturbing dreams per night for 7 nights in the week. Their total number of nightmares per week would be 2 nightmares $\times$ 7 nights $=$ 14.)

PCL-5

<u>Instructions</u>: This questionnaire asks about problems you may have had after a very stressful experience involving *actual or threatened death, serious injury, or sexual violence*. It could be something that happened to you directly, something you witnessed, or something you learned happened to a close family member or close friend. Some examples are a *serious accident; fire; disaster such as a hurricane, tornado, or earthquake; physical or sexual attack or abuse; war; homicide; or suicide.*

First, please answer a few questions about your *worst event*, which for this questionnaire means the event that currently bothers you the most. This could be one of the examples above or some other very stressful experience. Also, it could be a single event (for example, a car crash) or multiple similar events (for example, multiple stressful events in a war-zone or repeated sexual abuse).

Briefly identify the worst event (if you feel comfortable doing so): _____

How long ago did it happen? _____ ***(please estimate if you are not sure)***

Did it involve actual or threatened death, serious injury, or sexual violence?

_____Yes

_____No

How did you experience it?

_____ It happened to me directly

_____ I witnessed it

_____ I learned about it happening to a close family member or close friend

_____ I was repeatedly exposed to details about it as part of my job (for example, paramedic, police, military, or other first responder)

_____ Other, please describe _____

If the event involved the death of a close family member or close friend, was it due to some kind of accident or violence, or was it due to natural causes?

_____Accident or violence

_____Natural causes

_____Not applicable (the event did not involve the death of a close family member or close friend)

Second, keeping this worst event in mind, read each of the problems on the next page and then circle one of the numbers to the right to indicate how much you have been bothered by that problem <u>in the past month</u>.

In the past month, how much were you bothered by:	*Not at all*	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
1. Repeated, disturbing, and unwanted memories of the stressful experience?	**0**	**1**	**2**	**3**	**4**
2. Repeated, disturbing dreams of the stressful experience?	**0**	**1**	**2**	**3**	**4**
3. Suddenly feeling or acting as if the stressful experience were actually happening again *(as if you were actually back there reliving it)*?	**0**	**1**	**2**	**3**	**4**
4. Feeling very upset when something reminded you of the stressful experience?	**0**	**1**	**2**	**3**	**4**
5. Having strong physical reactions when something reminded you of the stressful experience *(for example, heart pounding, trouble breathing, sweating)*?	**0**	**1**	**2**	**3**	**4**
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	**0**	**1**	**2**	**3**	**4**
7. Avoiding external reminders of the stressful experience *(for example, people, places, conversations, activities, objects, or situations)*?	**0**	**1**	**2**	**3**	**4**
8. Trouble remembering important parts of the stressful experience?	**0**	**1**	**2**	**3**	**4**
9. Having strong negative beliefs about yourself, other people, or the world *(for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)*?	**0**	**1**	**2**	**3**	**4**
10. Blaming yourself or someone else for the stressful experience or what happened after it?	**0**	**1**	**2**	**3**	**4**
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	**0**	**1**	**2**	**3**	**4**
12. Loss of interest in activities that you used to enjoy?	**0**	**1**	**2**	**3**	**4**
13. Feeling distant or cut off from other people?	**0**	**1**	**2**	**3**	**4**
14. Trouble experiencing positive feelings *(for example, being unable to feel happiness or have loving feelings for people close to you)*?	**0**	**1**	**2**	**3**	**4**
15. Irritable behavior, angry outbursts, or acting aggressively?	**0**	**1**	**2**	**3**	**4**
16. Taking too many risks or doing things that could cause you harm?	**0**	**1**	**2**	**3**	**4**
17. Being "superalert" or watchful or on guard?	**0**	**1**	**2**	**3**	**4**
18. Feeling jumpy or easily startled?	**0**	**1**	**2**	**3**	**4**
19. Having difficulty concentrating?	**0**	**1**	**2**	**3**	**4**
20. Trouble falling or staying asleep?	**0**	**1**	**2**	**3**	**4**

PCL-5 (8/14/2013) Weathers, Litz, Keane, Palmieri, Marx, & Schnurr -- National Center for PTSD

PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

SUBJECT #:_____ **DATE:**_____

Over the last *2 weeks,* how often have you been bothered by any of the following problems?
(use "✓" to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so figety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3
add columns		+	+	

(Healthcare professional: For interpretation of TOTAL, please refer to accompanying scoring card). TOTAL:

10. If you checked off *any problems,* how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?

- Not difficult at all _____
- Somewhat difficult _____
- Very difficult _____
- Extremely difficult _____

A2663B 10-04-2005

PHQ-9 Patient Depression Questionnaire

For initial diagnosis:

1. Patient completes PHQ-9 Quick Depression Assessment.
2. If there are at least 4 ✓s in the shaded section (including Questions #1 and #2), consider a depressive disorder. Add score to determine severity.

Consider Major Depressive Disorder

- if there are at least 5 ✓s in the shaded section (one of which corresponds to Question #1 or #2)

Consider Other Depressive Disorder

- if there are 2-4 ✓s in the shaded section (one of which corresponds to Question #1 or #2)

Note: Since the questionnaire relies on patient self-report, all responses should be verified by the clinician, and a definitive diagnosis is made on clinical grounds taking into account how well the patient understood the questionnaire, as well as other relevant information from the patient.
Diagnoses of Major Depressive Disorder or Other Depressive Disorder also require impairment of social, occupational, or other important areas of functioning (Question #10) and ruling out normal bereavement, a history of a Manic Episode (Bipolar Disorder), and a physical disorder, medication, or other drug as the biological cause of the depressive symptoms.

To monitor severity over time for newly diagnosed patients or patients in current treatment for depression:

1. Patients may complete questionnaires at baseline and at regular intervals (eg, every 2 weeks) at home and bring them in at their next appointment for scoring or they may complete the questionnaire during each scheduled appointment.
2. Add up ✓s by column. For every ✓: Several days = 1 More than half the days = 2 Nearly every day = 3
3. Add together column scores to get a TOTAL score.
4. Refer to the accompanying **PHQ-9 Scoring Box** to interpret the TOTAL score.
5. Results may be included in patient files to assist you in setting up a treatment goal, determining degree of response, as well as guiding treatment intervention.

Scoring: add up all checked boxes on PHQ-9

For every ✓ Not at all = 0; Several days = 1;
More than half the days = 2; Nearly every day = 3

Interpretation of Total Score

Total Score	Depression Severity
1-4	Minimal depression
5-9	Mild depression
10-14	Moderate depression
15-19	Moderately severe depression
20-27	Severe depression

A2662B 10-04-2005

Session _____ID#_____Date_____Time_____AM PM

PITTSBURGH SLEEP QUALITY INDEX

INSTRUCTIONS:
The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?

   BED TIME _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

   NUMBER OF MINUTES _____

3. During the past month, what time have you usually gotten up in the morning?

   GETTING UP TIME _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

   HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you . . .

a) Cannot get to sleep within 30 minutes

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

b) Wake up in the middle of the night or early morning

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

c) Have to get up to use the bathroom

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

d) Cannot breathe comfortably

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

e) Cough or snore loudly

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

f) Feel too cold

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

g) Feel too hot

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

h) Had bad dreams

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

i) Have pain

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

j) Other reason(s), please describe_____

_____

How often during the past month have you had trouble sleeping because of this?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

6. During the past month, how would you rate your sleep quality overall?

Very good _____

Fairly good _____

Fairly bad _____

Very bad _____

7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all _____

Only a very slight problem _____

Somewhat of a problem _____

A very big problem _____

10. Do you have a bed partner or room mate?

No bed partner or room mate _____

Partner/room mate in other room _____

Partner in same room, but not same bed _____

Partner in same bed _____

If you have a room mate or bed partner, ask him/her how often in the past month you have had . . .

a) Loud snoring

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

b) Long pauses between breaths while asleep

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

c) Legs twitching or jerking while you sleep

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

d) Episodes of disorientation or confusion during sleep

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

e) Other restlessness while you sleep; please describe_____

_____

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: Psychiatry Research, 28:193-213, 1989.

Subject ID_____ Paradigm #_____ Date_____

Ask Participant "How are you Doing?"
Also, for all phases, only ask questions about colors that the participant claims to have seen.

Day 1
Post-Conditioning Questions:
Conditioning awareness:

1. Did you receive a shock?
   Yes No

2. Which setting were you in?
   Desert City

3. Which colored vehicles did you see?
   Blue Yellow Red

4. Was the Blue Truck followed by any shocks? *(only if the subject says blue to question #3)*
   Yes No

5. Was the Yellow Bus followed by any shocks? *(only if the subject says yellow to question #3)*
   Yes No

6. Was the Red Car followed by any shocks? *(only if the subject says red to question #3)*
   Yes No

Shock Expectation (*only ask the questions for the colors they report seeing in question #3)*

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *first two* presentations of the:

1. Blue Truck:
   1 2 3 4 5
2. Yellow Bus:
   1 2 3 4 5
3. Red Car:
   1 2 3 4 5

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *last two* presentations of the:

4. Blue Truck:
   1 2 3 4 5
5. Yellow Bus:
   1 2 3 4 5
6. Red Car:
   1 2 3 4 5

Post-Extinction Questions:

Extinction Awareness:

1. Did you receive a shock?
   Yes No

2. Which setting were you in?
   Desert City

3. Which colored vehicles did you see?
   Blue Yellow Red

Shock Expectation (*only ask the questions for the colors they report seeing in question #3)*

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *first two* presentations of the:

1. Blue Truck:
   1 2 3 4 5
2. Yellow Bus:
   1 2 3 4 5
3. Red Truck:
   1 2 3 4 5

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *last two* presentations of the:

4. Blue Truck:
   1 2 3 4 5
5. Yellow Bus:
   1 2 3 4 5
6. Red Car:
   1 2 3 4 5

Subject ID_____ Paradigm #_____ Date_____

Ask Participant "How are you Doing?"
Also, for all phases, only ask questions about colors that the participant claims to have seen.

Day 2
Retrospective Questions:
Conditioning awareness:

1. Which colored vehicles were followed by the finger shock last time you were here?
   Blue Yellow Red

2. Did you receive the finger shocks in a particular setting?
   Desert City

Post-Recall Questions:

Recall Awareness:

1. Did you receive a shock?
   Yes No

2. Which setting were you in?
   Desert City

3. Which colored vehicles did you see?
   Blue Yellow Red

Shock Expectation (*only ask the questions for the colors they report seeing in question #3)*

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *first two* presentations of the:

1. Blue Truck:
   1 2 3 4 5
2. Yellow Bus:
   1 2 3 4 5
3. Red Car:
   1 2 3 4 5

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *last two* presentations of the:

4. Blue Truck:
   1 2 3 4 5
5. Yellow Bus:
   1 2 3 4 5
6. Red Car:
   1 2 3 4 5

Post-Renewal Questions:

Renewal Awareness:

1. Did you receive a shock?
   Yes No

2. Which setting were you in?
   Desert City

3. Which colored vehicles did you see?
   Blue Yellow Red

Shock Expectation (*only ask the questions for the colors they report seeing in question #3)*

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *first two* presentations of the:

1. Blue Truck:
   1 2 3 4 5
2. Yellow Bus:
   1 2 3 4 5
3. Red Car:
   1 2 3 4 5

On a scale from 1 to 5 (1=not at all, 5=very much), how much were you expecting to be shocked for the *last two* presentations of the:

4. Blue Truck:
   1 2 3 4 5
5. Yellow Bus:
   1 2 3 4 5
6. Red Car:
   1 2 3 4 5

Psychomotor Vigilance Test

Press the spacebar every time an “x” appears on the screen.

RBANS UPDATE

Christopher Randolph

Record Form a

Subject # _____ Age_____ Sex_____ Education Level _____

Examiner_____ Date of Testing _____ Ethnicity _____

	Immediate Memory	Visuospatial/ Constructional	Language	Attention	Delayed Memory		TOTAL SCALE	
Index Score								
Confidence Interval ____%								
Percentile								
Index Score						Percentile Rank		Total Scale Index Score
160						>99.9		160
155						>99.9		155
150						>99.9		150
145						99.9		145
140						99.6		140
135						99		135
130						98		130
125						95		125
120						91		120
115						84		115
110						75		110
105						63		105
100						50		100
95						37		95
90						25		90
85						16		85
80						9		80
75						5		75
70						2		70
65						1		65
60						0.4		60
55						0.1		55
50						<0.1		50
45						<0.1		45
40						<0.1		40

Observations: _____

_____

_____

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5 6 7 8 9 10 11 12 A B C D E

Product Number 0158007212

1 List Learning

Trial 1

Say ***I am going to read you a list of words. I want you to listen carefully and, when I finish, repeat back as many words as you can. You don't have to say them in the same order that I do—just repeat back as many words as you can remember, in any order. Okay?***

Trials 2–4

Say ***I am going to read the list again. When I finish, repeat back as many words as you can, even if you have already said them before. Okay?***

Record responses in order.

Scoring: 1 point for each word correctly recalled on each trial.

List	Trial 1	Trial 2	Trial 3	Trial 4
Market				
Package				
Elbow				
Apple				
Story				
Carpet				
Bubble				
Highway				
Saddle				
Powder				

Number Correct		+		+		+		=	
	Total Trial 1		Total Trial 2		Total Trial 3		Total Trial 4		Total Score Range=0–40

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2 Story Memory

Trial 1

Say ***I am going to read you a short story. I'd like you to listen carefully and, when I finish, repeat back as much of the story as you can remember. Try and use the same wording, if you can. Okay?***

Read the story below, then say ***Now repeat back as much of that story as you can.***

Trial 2

Say ***I am going to read that same story again. When I finish, I want you to again repeat back as much of the story as you can remember. Try to repeat it as exactly as you can.***

Read the story below, then say ***Now repeat back as much of that story as you can.***

Scoring: 1 point for *verbatim* recall of bold, italic words or alternatives, shown below in color within parentheses. Record intrusions or variations in the Responses column.

Story	Trial 1 Responses	Trial 1 Score (0 or 1)	Trial 2 Responses	Trial 2 Score (0 or 1)	Item Score (0–2)
1. On ***Tuesday,***					
2. ***May***					
3. ***Fourth,***					
4. in ***Cleveland,*** Ohio,					
5. a ***3 alarm***					
6. ***fire*** broke out.					
7. ***Two***					
8. ***hotels***					
9. and a ***restaurant***					
10. were ***destroyed***					
11. before the ***firefighters*** *(firemen)*					
12. were able to ***extinguish it*** ***(put it out).***					
				Total Score (Trial 1 + Trial 2) Range=0–24	

3 Figure Copy

Time Limit: 4 minutes

Fold this page back and present the Figure Copy Drawing Page along with the stimulus. Ask the examinee to make an exact copy of the figure. Tell the examinee that he or she is being timed, but that the score is based *only* on the exactness of his or her copy.

Scoring: 1 point for correctness and completeness (drawing), and 1 point for proper placement. See Appendix 1 in Stimulus Booklet A for complete scoring criteria and scoring examples.

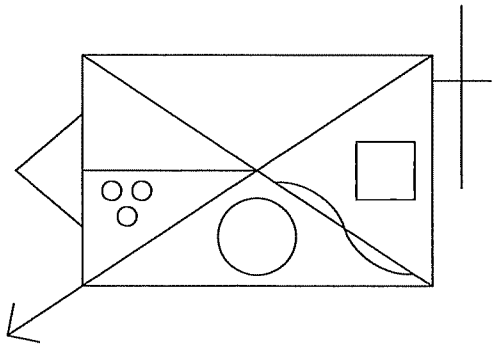


Figure Copy Criteria

(Fold back for use.)

Item	Drawing (0 or 1)	Placement (0 or 1)	Score (0, 1, or 2)	Scoring Criteria
1. rectangle				Drawing: lines are unbroken and straight; angles 90 degrees; top/bottom lines 25% longer than sides Placement: not rotated more than 15 degrees
2. diagonal cross				Drawing: lines are unbroken and straight and should approximately bisect each other Placement: ends of lines should meet corners of the rectangle without significant overlap or measurable distance between the ends of the lines and the corners
3. horizontal line				Drawing: line is unbroken and straight; should not exceed 1/2 the length of the rectangle Placement: should bisect left side of the rectangle at approximately a right angle and intersect the diagonal cross
4. circle				Drawing: round, unbroken and closed; diameter should be approximately 1/4–1/3 height of rectangle Placement: placed in appropriate segment; not touching any other part of figure
5. 3 small circles				Drawing: round, unbroken and closed; equal size; triangular arrangement; not touching each other Placement: in appropriate segment; not touching figure; triangle formed not rotated more than 15 degrees
6. square				Drawing: must be closed; 90 degree angles; lines straight and unbroken; height is 1/4–1/3 height of rectangle Placement: in appropriate segment; not touching any other part of figure; not rotated more than 15 degrees
7. curving line				Drawing: 2 curved segments are approximately equal in length and symmetrical; correct direction of curves Placement: ends of line touch diagonal; do not touch corner of rectangle or intersection of diagonal lines
8. outside cross				Drawing: vertical line of the outside cross is parallel to side of rectangle; >1/2 the height of rectangle; horizontal line crosses vertical at 90 degree angle and is between 20–50% of length of vertical line Placement: horizontal line of outside cross touches rectangle higher than 2/3 the height of rectangle, but below top; does not penetrate the rectangle
9. triangle				Drawing: angle formed by 2 sides of triangle is between 60–100 degrees; sides are straight, unbroken and meet in a point; distance on vertical side of rectangle subsumed by triangle is approximately 50% of the height of vertical side Placement: roughly centered on the left vertical side of the rectangle
10. arrow				Drawing: straight and unbroken; lines forming arrow are approximately equal in length and not more than 1/3 length of staff Placement: must protrude from appropriate corner of rectangle such that staff appears to be continuation of diagonal cross
	Total Score Range=0–20			

Figure Copy Drawing Page

(Fold back for use.)

4 Line Orientation

Time Limit: 20 seconds/item

Present the sample item, and say ***These two lines down here*** (indicate) ***match two of the lines on top. Can you tell me the numbers, or point to the lines that they match?*** Correct any errors and make sure the examinee understands the task. Continue with Items 1–10.

Scoring: 1 point for each line correctly identified.

Item	Responses	Correct Responses	Score (0, 1, or 2)
Sample		1, 7	
1.		10, 12	
2.		4, 11	
3.		6, 9	
4.		8, 13	
5.		2, 4	

Item	Responses	Correct Responses	Score (0, 1, or 2)
6.		1, 6	
7.		3, 10	
8.		5, 8	
9.		1, 3	
10.		11, 13	
		Total Score Range=0–20	

5 Picture Naming

Time Limit: 20 seconds/item

Ask the examinee to name each picture. Give the semantic cue only if the picture is obviously misperceived.

Scoring: 1 point for each item that is correctly named spontaneously or following semantic cue.

Item	Semantic Cue	Responses	Score (0 or 1)
1. chair	a piece of furniture		
2. pencil	used for writing		
3. well	you get water from it		
4. giraffe	an animal		
5. sailboat	used on the water (if "boat," query "what kind")		
6. cannon	a weapon, used in war		
7. pliers	a tool		
8. trumpet	a musical instrument ("cornet" okay)		
9. clothespin	used to hold laundry on a line		
10. kite	it's flown in the air		
		Total Score Range=0–10	

6 Semantic Fluency

Time Limit: 60 seconds

Say ***Now I'd like you to tell me the names of all of the different kinds of fruits and vegetables that you can think of. I'll give you one minute to come up with as many as you can. Ready?***

Scoring: 1 point for each correct response.

1. _____	11. _____	21. _____	31. _____
2. _____	12. _____	22. _____	32. _____
3. _____	13. _____	23. _____	33. _____
4. _____	14. _____	24. _____	34. _____
5. _____	15. _____	25. _____	35. _____
6. _____	16. _____	26. _____	36. _____
7. _____	17. _____	27. _____	37. _____
8. _____	18. _____	28. _____	38. _____
9. _____	19. _____	29. _____	39. _____
10. _____	20. _____	30. _____	40. _____

Total Score
Range=0–40 ☐

7 Digit Span

Say ***I am going to say some numbers, and I want you to repeat them after me. Okay?***
Read the numbers at the rate of 1 per second. Only read the second string in each set if the first string was failed. Discontinue after failure of both strings in any set.

Scoring: 2 points for the first string correct, 1 point for the second string correct, and 0 points for both strings failed.

Item	First String	String Score (0 or 2)	Second String	String Score (0 or 1)	Item Score (0–2)
1.	**4—9**		**5—3**		
2.	**8—3—5**		**2—4—1**		
3.	**7—2—4—6**		**1—6—3—8**		
4.	**5—3—9—2—4**		**3—8—4—9—1**		
5.	**6—4—2—9—3—5**		**9—1—5—3—7—6**		
6.	**2—8—5—1—9—3—7**		**5—3—1—7—4—9—2**		
7.	**8—3—7—9—5—2—4—1**		**9—5—1—4—2—7—3—8**		
8.	**1—5—9—2—3—8—7—4—6**		**5—1—9—7—6—2—3—6—5**		

Total Score
Range=0–16 ☐

8 Coding

Time Limit: 90 seconds

Say ***Look at these boxes*** (indicate key). ***For each one of these marks there is a number that goes with it. Down here there are marks, but no numbers. I want you to fill in the number that goes with each mark.***

Demonstrate the first three. Say ***Now I would like you to fill in the rest of these boxes up to the double lines*** (indicate) ***for practice.*** Correct any errors as they are made. Make sure that the examinee understands the task and has correctly completed the sample items before you begin timing.

Say ***Now I would like you to continue to fill in the numbers that match the marks. Go as quickly as you can without skipping any. When you reach the end of the line, go on to the next one. Ready? Go ahead.***

Redirect the examinee to the task if he or she becomes distracted. If the examinee is unable to comprehend the task, the subtest score is 0.

Scoring: 1 point for each item correctly coded within 90 seconds (*do not* score the sample items).

Note: Familiarize yourself with these instructions before administering this subtest.

Total Score
Range=0–89

9 List Recall

Say ***Do you remember the list of words that I read to you in the beginning? Tell me as many of those words as you can remember now.***

Scoring: 1 point for each word correctly recalled.

List (Do not read.)	Response	Score (0 or 1)
Market		
Package		
Elbow		
Apple		
Story		
Carpet		
Bubble		
Highway		
Saddle		
Powder		
	Total Score Range=0–10	

10 List Recognition

Say ***I'm going to read you some words. Some of these words were on that list, and some of them weren't. I want you to tell me which words were on the list.*** For each word, ask ***Was _____ on the list?***

Scoring: 1 point for each word correctly identified. Circle the letter corresponding to examinee's response (y = yes, n = no); bold, capitalized (**Y, N**) letter indicates correct response.

List	Circle One		List	Circle One		List	Circle One		List	Circle One	
1. **Apple**	**Y**	n	6. sailor	y	**N**	11. **Bubble**	**Y**	n	16. **Saddle**	**Y**	n
2. honey	y	**N**	7. velvet	y	**N**	12. prairie	y	**N**	17. **Powder**	**Y**	n
3. **Market**	**Y**	n	8. **Carpet**	**Y**	n	13. **Highway**	**Y**	n	18. angel	y	**N**
4. **Story**	**Y**	n	9. valley	y	**N**	14. oyster	y	**N**	19. **Package**	**Y**	n
5. fabric	y	**N**	10. **Elbow**	**Y**	n	15. student	y	**N**	20. meadow	y	**N**
									Total Score Range=0–20		

Story Recall

Say ***Do you remember that story about a fire that I read to you earlier? Tell me as many details from the story as you can remember now.***

Scoring: 1 point for each *verbatim* recall of bold, italic words or alternatives, shown below in color within parentheses. Record intrusions or variations in the Responses column.

Story (Do not read.)	Responses	Item Score (0 or 1)
1. On ***Tuesday,***		
2. ***May***		
3. ***Fourth,***		
4. in ***Cleveland,*** Ohio,		
5. a ***3 alarm***		
6. ***fire*** broke out.		
7. ***Two***		
8. ***hotels***		
9. and a ***restaurant***		
10. were ***destroyed***		
11. before the ***firefighters*** *(firemen)*		
12. were able to ***extinguish it*** *(put it out).*		
	Total Score Range=0–12	

12 Figure Recall

Say ***Do you remember that figure that I had you copy? I want you to draw as much of it as you can remember now. If you remember a part, but you're not sure where it goes, put it anywhere. Try to draw as much of it as you can.***

Now, present the Figure Recall Drawing Page.

Scoring: 1 point for correctness and completeness (drawing), and 1 point for proper placement. See Appendix 1 in Stimulus Booklet A for complete scoring criteria and scoring examples.

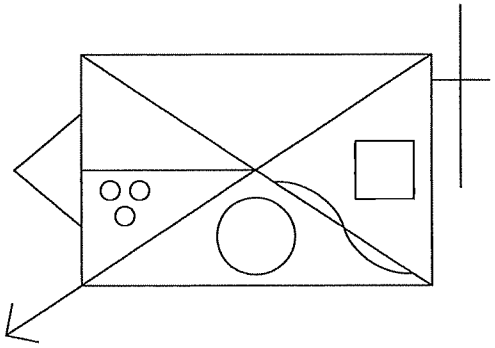


Figure Recall Criteria

(Fold back for use.)

Item	Drawing (0 or 1)	Placement (0 or 1)	Score (0, 1, or 2)	Scoring Criteria
1. rectangle				**Drawing:** lines are unbroken and straight; angles 90 degrees; top/bottom lines 25% longer than sides **Placement:** not rotated more than 15 degrees
2. diagonal cross				**Drawing:** lines are unbroken and straight and should approximately bisect each other **Placement:** ends of lines should meet corners of the rectangle without significant overlap or measurable distance between the ends of the lines and the corners
3. horizontal line				**Drawing:** line is unbroken and straight; should not exceed 1/2 the length of the rectangle **Placement:** should bisect left side of the rectangle at approximately a right angle and intersect the diagonal cross
4. circle				**Drawing:** round, unbroken and closed; diameter should be approximately 1/4–1/3 height of rectangle **Placement:** placed in appropriate segment; not touching any other part of figure
5. 3 small circles				**Drawing:** round, unbroken and closed; equal size; triangular arrangement; not touching each other **Placement:** in appropriate segment; not touching figure; triangle formed not rotated more than 15 degrees
6. square				**Drawing:** must be closed; 90 degree angles; lines straight and unbroken; height is 1/4–1/3 height of rectangle **Placement:** in appropriate segment; not touching any other part of figure; not rotated more than 15 degrees
7. curving line				**Drawing:** 2 curved segments are approximately equal in length and symmetrical; correct direction of curves **Placement:** ends of line touch diagonal; do not touch corner of rectangle or intersection of diagonal lines
8. outside cross				**Drawing:** vertical line of the outside cross is parallel to side of rectangle; >1/2 the height of rectangle; horizontal line crosses vertical at 90 degree angle and is between 20–50% of length of vertical line **Placement:** horizontal line of outside cross touches rectangle higher than 2/3 the height of rectangle, but below top; does not penetrate the rectangle
9. triangle				**Drawing:** angle formed by 2 sides of triangle is between 60–100 degrees; sides are straight, unbroken and meet in a point; distance on vertical side of rectangle subsumed by triangle is approximately 50% of the height of vertical side **Placement:** roughly centered on the left vertical side of the rectangle
10. arrow				**Drawing:** straight and unbroken; lines forming arrow are approximately equal in length and not more than 1/3 length of staff **Placement:** must protrude from appropriate corner of rectangle such that staff appears to be continuation of diagonal cross
		Total Score Range=0–20		

Figure Recall Drawing Page

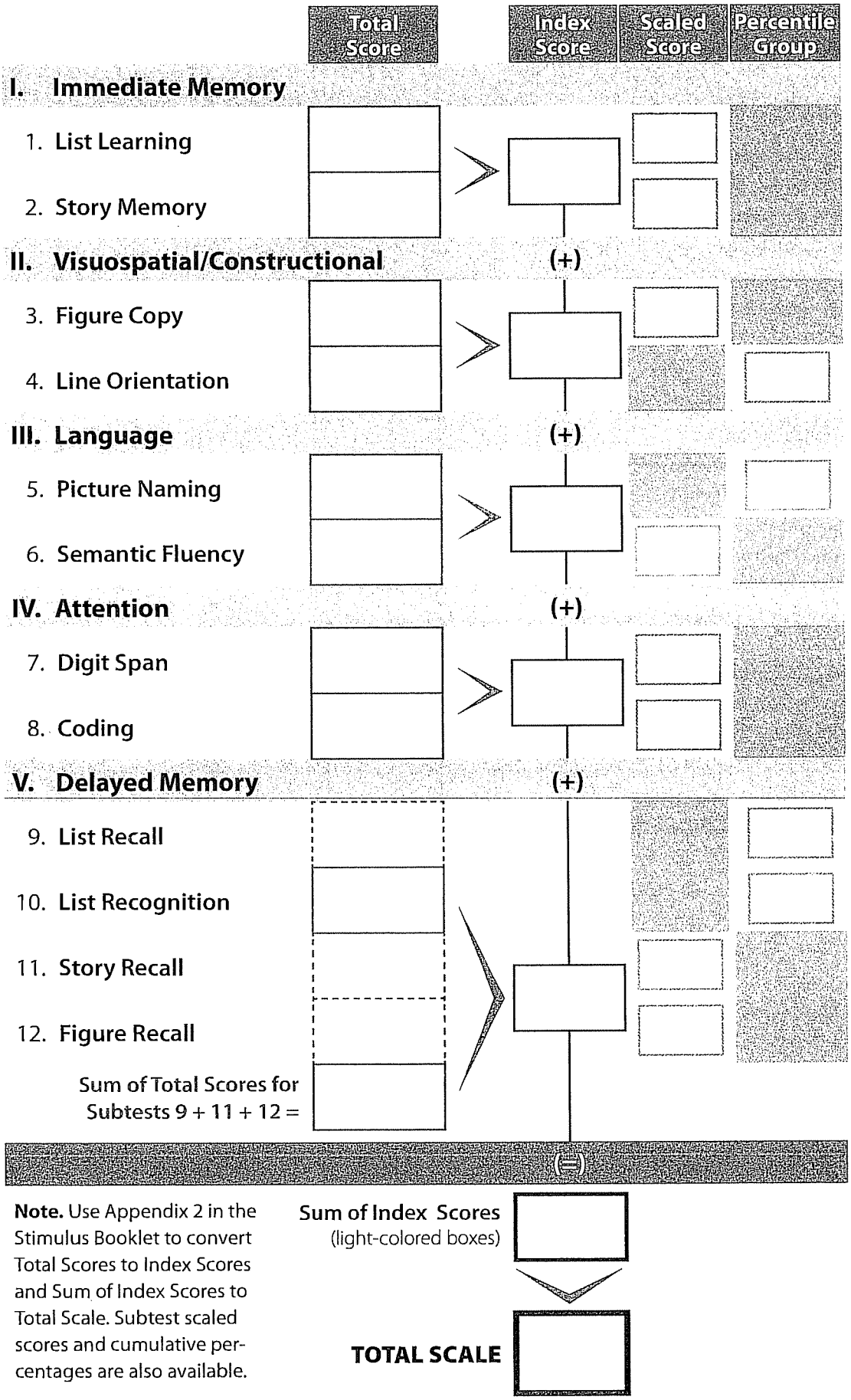
(Fold back for use.)

Supplemental Discrepancy Analysis Page

Index Differences

Score 1–Score 2	Score 1	Score 2	Difference	Statistical Significance _____Level	Frequency of Difference in Standardization Sample
Immediate Memory—Visuospatial/Constructional					
Immediate Memory—Attention					
Immediate Memory—Language					
Immediate Memory—Delayed Memory					
Immediate Memory—Total Scale					
Visuospatial/Constructional—Attention					
Visuospatial/Constructional—Language					
Visuospatial/Constructional—Delayed Memory					
Visuospatial/Constructional—Total Scale					
Attention—Language					
Attention—Delayed Memory					
Attention—Total Scale					
Language—Delayed Memory					
Language—Total Scale					
Delayed Memory—Total Scale					

Score Conversion Page



Note. Use Appendix 2 in the Stimulus Booklet to convert Total Scores to Index Scores and Sum of Index Scores to Total Scale. Subtest scaled scores and cumulative percentages are also available.

RBANS UPDATE

Christopher Randolph

Record Form b

Subject ID: _____ Age_____ Sex_____ Education Level _____

Examiner_____ Date of Testing _____ Ethnicity _____

	Immediate Memory	Visuospatial/ Constructional	Language	Attention	Delayed Memory	TOTAL SCALE
Index Score						
Confidence Interval ____%						
Percentile						

Index Score	Percentile Rank	Total Scale Index Score
160	>99.9	160
155	>99.9	155
150	>99.9	150
145	99.9	145
140	99.6	140
135	99	135
130	98	130
125	95	125
120	91	120
115	84	115
110	75	110
105	63	105
100	50	100
95	37	95
90	25	90
85	16	85
80	9	80
75	5	75
70	2	70
65	1	65
60	0.4	60
55	0.1	55
50	<0.1	50
45	<0.1	45
40	<0.1	40

Observations: _____

_____

_____

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3 4 5 6 7 8 9 10 11 12 A B C D E

Product Number 0158007220

1 List Learning

Trial 1

Say ***I am going to read you a list of words. I want you to listen carefully and, when I finish, repeat back as many words as you can. You don't have to say them in the same order that I do—just repeat back as many words as you can remember, in any order. Okay?***

Trials 2–4

Say ***I am going to read the list again. When I finish, repeat back as many words as you can, even if you have already said them before. Okay?***

Record responses in order.

Scoring: 1 point for each word correctly recalled on each trial.

List	Trial 1	Trial 2	Trial 3	Trial 4
Candle				
Sugar				
Wagon				
Hotel				
Farmer				
Village				
Sandwich				
Feather				
Artist				
Paper				

Number Correct		+		+		+		=	
	Total Trial 1		Total Trial 2		Total Trial 3		Total Trial 4		Total Score Range=0–40

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2 Story Memory

Trial 1

Say ***I am going to read you a short story. I'd like you to listen carefully and, when I finish, repeat back as much of the story as you can remember. Try and use the same wording, if you can. Okay?***

Read the story below, then say ***Now repeat back as much of that story as you can.***

Trial 2

Say ***I am going to read that same story again. When I finish, I want you to again repeat back as much of the story as you can remember. Try to repeat it as exactly as you can.***

Read the story below, then say ***Now repeat back as much of that story as you can.***

Scoring: 1 point for *verbatim* recall of bold, italic words or alternatives, shown below in color within parentheses. Record intrusions or variations in the Responses column.

Story	Trial 1 Responses	Trial 1 Score (0 or 1)	Trial 2 Responses	Trial 2 Score (0 or 1)	Item Score (0–2)
1. On ***Monday,***					
2. ***March***					
3. ***Fifth,***					
4. in ***Miami,*** Florida,					
5. a ***tidal wave*** hit.					
6. Although ***2 million dollars***					
7. in ***damage*** was done					
8. to the ***waterfront,***					
9. only ***seven people***					
10. were ***injured, (hurt)***					
11. and ***nobody (no one)***					
12. was ***killed.***					
				Total Score (Trial 1 + Trial 2) Range=0–24	

3 Figure Copy

Time Limit: 4 minutes

Fold this page back and present the Figure Copy Drawing Page along with the stimulus. Ask the examinee to make an exact copy of the figure. Tell the examinee that he or she is being timed, but that the score is based *only* on the exactness of his or her copy.

Scoring: 1 point for correctness and completeness (drawing), and 1 point for proper placement. See Appendix 1 in Stimulus Booklet B for complete scoring criteria and scoring examples.

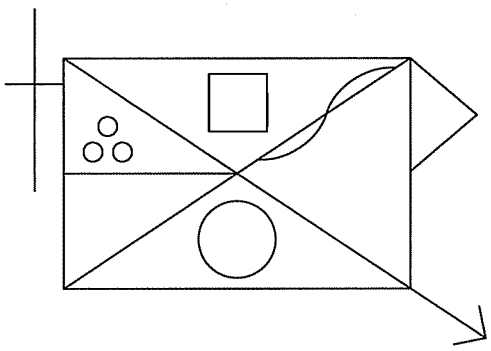


Figure Copy Criteria

(Fold back for use.)

Item	Drawing (0 or 1)	Placement (0 or 1)	Score (0, 1, or 2)	Scoring Criteria
1. rectangle				**Drawing:** lines are unbroken and straight; angles 90 degrees; top/bottom lines 25% longer than sides **Placement:** not rotated more than 15 degrees
2. diagonal cross				**Drawing:** lines are unbroken and straight and should approximately bisect each other **Placement:** ends of lines should meet corners of the rectangle without significant overlap or measurable distance between the ends of the lines and the corners
3. horizontal line				**Drawing:** line is unbroken and straight; should not exceed 1/2 the length of the rectangle **Placement:** should bisect left side of the rectangle at approximately a right angle and intersect the diagonal cross
4. circle				**Drawing:** round, unbroken and closed; diameter should be approximately 1/4–1/3 height of rectangle **Placement:** placed in appropriate segment; not touching any other part of figure
5. 3 small circles				**Drawing:** round, unbroken and closed; equal size; triangular arrangement; not touching each other **Placement:** in appropriate segment; not touching figure; triangle formed not rotated more than 15 degrees
6. square				**Drawing:** must be closed; 90 degree angles; lines straight and unbroken; height is 1/4–1/3 height of rectangle **Placement:** in appropriate segment; not touching any other part of figure; not rotated more than 15 degrees
7. curving line				**Drawing:** 2 curved segments are approximately equal in length and symmetrical; correct direction of curves **Placement:** ends of line touch diagonal; do not touch corner of rectangle or intersection of diagonal lines
8. outside cross				**Drawing:** vertical line of the outside cross is parallel to side of rectangle; >1/2 the height of rectangle; horizontal line crosses vertical at 90 degree angle and is between 20–50% of length of vertical line **Placement:** horizontal line of outside cross touches rectangle higher than 2/3 the height of rectangle, but below top; does not penetrate the rectangle
9. triangle				**Drawing:** angle formed by 2 sides of triangle is between 60–100 degrees; sides are straight, unbroken and meet in a point; distance on vertical side of rectangle subsumed by triangle is approximately 50% of the height of vertical side **Placement:** no measurable distance between the top of the rectangle and the triangle
10. arrow				**Drawing:** straight and unbroken; lines forming arrow are approximately equal in length and not more than 1/3 length of staff **Placement:** must protrude from appropriate corner of rectangle such that staff appears to be continuation of diagonal cross
		Total Score Range=0–20		

Figure Copy Drawing Page

(Fold back for use.)

4 Line Orientation

Time Limit: 20 seconds/item

Present the sample item, and say ***These two lines down here*** (indicate) ***match two of the lines on top. Can you tell me the numbers, or point to the lines that they match?*** Correct any errors and make sure the examinee understands the task. Continue with Items 1–10.

Scoring: 1 point for each line correctly identified.

Item	Responses	Correct Responses	Score (0, 1, or 2)
Sample		1, 7	
1.		2, 5	
2.		4, 12	
3.		6, 11	
4.		7, 10	
5.		9, 12	

Item	Responses	Correct Responses	Score (0, 1, or 2)
6.		2, 10	
7.		6, 12	
8.		3, 8	
9.		4, 7	
10.		2, 8	
		Total Score Range=0–20	

5 Picture Naming

Time Limit: 20 seconds/item

Ask the examinee to name each picture. Give the semantic cue only if the picture is obviously misperceived.

Scoring: 1 point for each item that is correctly named spontaneously or following semantic cue.

Item	Semantic Cue	Responses	Score (0 or 1)
1. bed	a piece of furniture		
2. mushroom	something that grows; can be eaten		
3. flower	grows in the garden		
4. iron	used to get wrinkles out of clothes		
5. barn	a type of building		
6. anchor	used on a boat		
7. hammer	a tool		
8. scissors	used for cutting		
9. dice	used in games		
10. sea horse	animal found in the ocean		
		Total Score Range=0–10	

6 Semantic Fluency

Time Limit: 60 seconds

Say ***Now I'd like you to tell me the names of all of the different kinds of animals you would find in a zoo that you can think of. I'll give you one minute to come up with as many as you can. Ready?***

Scoring: 1 point for each correct response.

1. _____	11. _____	21. _____	31. _____
2. _____	12. _____	22. _____	32. _____
3. _____	13. _____	23. _____	33. _____
4. _____	14. _____	24. _____	34. _____
5. _____	15. _____	25. _____	35. _____
6. _____	16. _____	26. _____	36. _____
7. _____	17. _____	27. _____	37. _____
8. _____	18. _____	28. _____	38. _____
9. _____	19. _____	29. _____	39. _____
10. _____	20. _____	30. _____	40. _____

Number Correct Range=0–40 [ ] + 4 = Total Score Range=4–40 [ ]

7 Digit Span

Say ***I am going to say some numbers, and I want you to repeat them after me. Okay?***
Read the numbers at the rate of 1 per second. Only read the second string in each set if the first string was failed. Discontinue after failure of both strings in any set.

Scoring: 2 points for the first string correct, 1 point for the second string correct, and 0 points for both strings failed.

Item	First String	String Score (0 or 2)	Second String	String Score (0 or 1)	Item Score (0–2)
1.	**9—4**		**3—5**		
2.	**5—3—8**		**1—4—2**		
3.	**6—4—2—7**		**8—3—6—1**		
4.	**4—2—9—3—5**		**1—9—4—8—3**		
5.	**5—3—9—2—4—6**		**6—3—7—5—1—9**		
6.	**6—3—9—5—1—8—2**		**2—9—4—7—1—3—5**		
7.	**4—2—6—9—1—7—3—8**		**8—3—7—9—1—4—2—5**		
8.	**3—1—7—8—2—9—5—4—6**		**2—1—9—5—4—7—3—8—6**		

Total Score Range=0–16 [ ]

8 Coding

Time Limit: 90 seconds

Say ***Look at these boxes*** (indicate key)***. For each one of these marks there is a number that goes with it. Down here there are marks, but no numbers. I want you to fill in the number that goes with each mark.***

Demonstrate the first three. Say ***Now I would like you to fill in the rest of these boxes up to the double lines*** (indicate) ***for practice.*** Correct any errors as they are made. Make sure that the examinee understands the task and has correctly completed the sample items before you begin timing.

Say ***Now I would like you to continue to fill in the numbers that match the marks. Go as quickly as you can without skipping any. When you reach the end of the line, go on to the next one. Ready? Go ahead.***

Redirect the examinee to the task if he or she becomes distracted. If the examinee is unable to comprehend the task, the subtest score is 0.

Scoring: 1 point for each item correctly coded within 90 seconds (*do not* score the sample items).

Note: Familiarize yourself with these instructions before administering this subtest.

Total Score Range=0–89	

9 List Recall

Say ***Do you remember the list of words that I read to you in the beginning? Tell me as many of those words as you can remember now.***

Scoring: 1 point for each word correctly recalled.

List (Do not read.)	Response	Score (0 or 1)
Candle		
Sugar		
Wagon		
Hotel		
Farmer		
Village		
Sandwich		
Feather		
Artist		
Paper		
	Total Score Range=0–10	

10 List Recognition

Say ***I'm going to read you some words. Some of these words were on that list, and some of them weren't. I want you to tell me which words were on the list.*** For each word, ask ***Was _____ on the list?***

Scoring: 1 point for each word correctly identified. Circle the letter corresponding to examinee's response (y = yes, n = no); bold, capitalized (**Y, N**) letter indicates correct response.

List	Circle One		List	Circle One		List	Circle One		List	Circle One	
1. **Candle**	**Y**	n	6. season	y	**N**	11. **Hotel**	**Y**	n	16. **Sandwich**	**Y**	n
2. metal	y	**N**	7. building	y	**N**	12. pupil	y	**N**	17. **Feather**	**Y**	n
3. **Farmer**	**Y**	n	8. **Wagon**	**Y**	n	13. **Artist**	**Y**	n	18. summer	y	**N**
4. **Paper**	**Y**	n	9. mirror	y	**N**	14. party	y	**N**	19. **Village**	**Y**	n
5. purple	y	**N**	10. **Sugar**	**Y**	n	15. castle	y	**N**	20. insect	y	**N**
									Total Score Range=0–20		

11 Story Recall

Say ***Do you remember that story about a tidal wave I read to you earlier? Tell me as many details from the story as you can remember now.***

Scoring: 1 point for each *verbatim* recall of bold, italic words or alternatives, shown below in color within parentheses. Record intrusions or variations in the Responses column.

Story (Do not read.)	Responses	Item Score (0 or 1)
1. On ***Monday,***		
2. ***March***		
3. ***Fifth,***		
4. in ***Miami,*** Florida,		
5. a ***tidal wave*** hit.		
6. Although ***2 million dollars***		
7. in ***damage*** was done		
8. to the ***waterfront,***		
9. only ***seven people***		
10. were ***injured, (hurt)***		
11. and ***nobody (no one)***		
12. was ***killed.***		
	Total Score Range=0–12	

12 Figure Recall

Say ***Do you remember that figure that I had you copy? I want you to draw as much of it as you can remember now. If you remember a part, but you're not sure where it goes, put it anywhere. Try to draw as much of it as you can.***

Now, present the Figure Recall Drawing Page.

Scoring: 1 point for correctness and completeness (drawing), and 1 point for proper placement. See Appendix 1 in Stimulus Booklet B for complete scoring criteria and scoring examples.

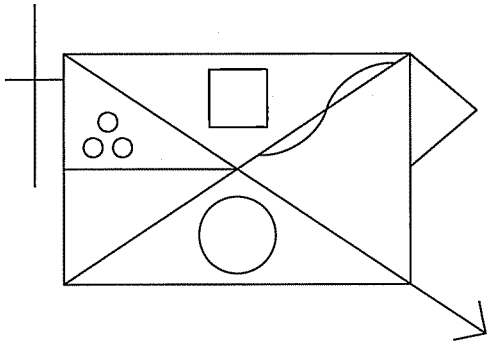


Figure Recall Criteria

(Fold back for use.)

Item	Drawing (0 or 1)	Placement (0 or 1)	Score (0, 1, or 2)	Scoring Criteria
1. rectangle				**Drawing:** lines are unbroken and straight; angles 90 degrees; top/bottom lines 25% longer than sides **Placement:** not rotated more than 15 degrees
2. diagonal cross				**Drawing:** lines are unbroken and straight and should approximately bisect each other **Placement:** ends of lines should meet corners of the rectangle without significant overlap or measurable distance between the ends of the lines and the corners
3. horizontal line				**Drawing:** line is unbroken and straight; should not exceed 1/2 the length of the rectangle **Placement:** should bisect left side of the rectangle at approximately a right angle and intersect the diagonal cross
4. circle				**Drawing:** round, unbroken and closed; diameter should be approximately 1/4–1/3 height of rectangle **Placement:** placed in appropriate segment; not touching any other part of figure
5. 3 small circles				**Drawing:** round, unbroken and closed; equal size; triangular arrangement; not touching each other **Placement:** in appropriate segment; not touching figure; triangle formed not rotated more than 15 degrees
6. square				**Drawing:** must be closed; 90 degree angles; lines straight and unbroken; height is 1/4–1/3 height of rectangle **Placement:** in appropriate segment; not touching any other part of figure; not rotated more than 15 degrees
7. curving line				**Drawing:** 2 curved segments are approximately equal in length and symmetrical; correct direction of curves **Placement:** ends of line touch diagonal; do not touch corner of rectangle or intersection of diagonal lines
8. outside cross				**Drawing:** vertical line of the outside cross is parallel to side of rectangle; >1/2 the height of rectangle; horizontal line crosses vertical at 90 degree angle and is between 20–50% of length of vertical line **Placement:** horizontal line of outside cross touches rectangle higher than 2/3 the height of rectangle, but below top; does not penetrate the rectangle
9. triangle				**Drawing:** angle formed by 2 sides of triangle is between 60–100 degrees; sides are straight, unbroken and meet in a point; distance on vertical side of rectangle subsumed by triangle is approximately 50% of the height of vertical side **Placement:** no measurable distance between the top of the rectangle and the triangle
10. arrow				**Drawing:** straight and unbroken; lines forming arrow are approximately equal in length and not more than 1/3 length of staff **Placement:** must protrude from appropriate corner of rectangle such that staff appears to be continuation of diagonal cross
		Total Score Range=0–20		

Figure Recall Drawing Page

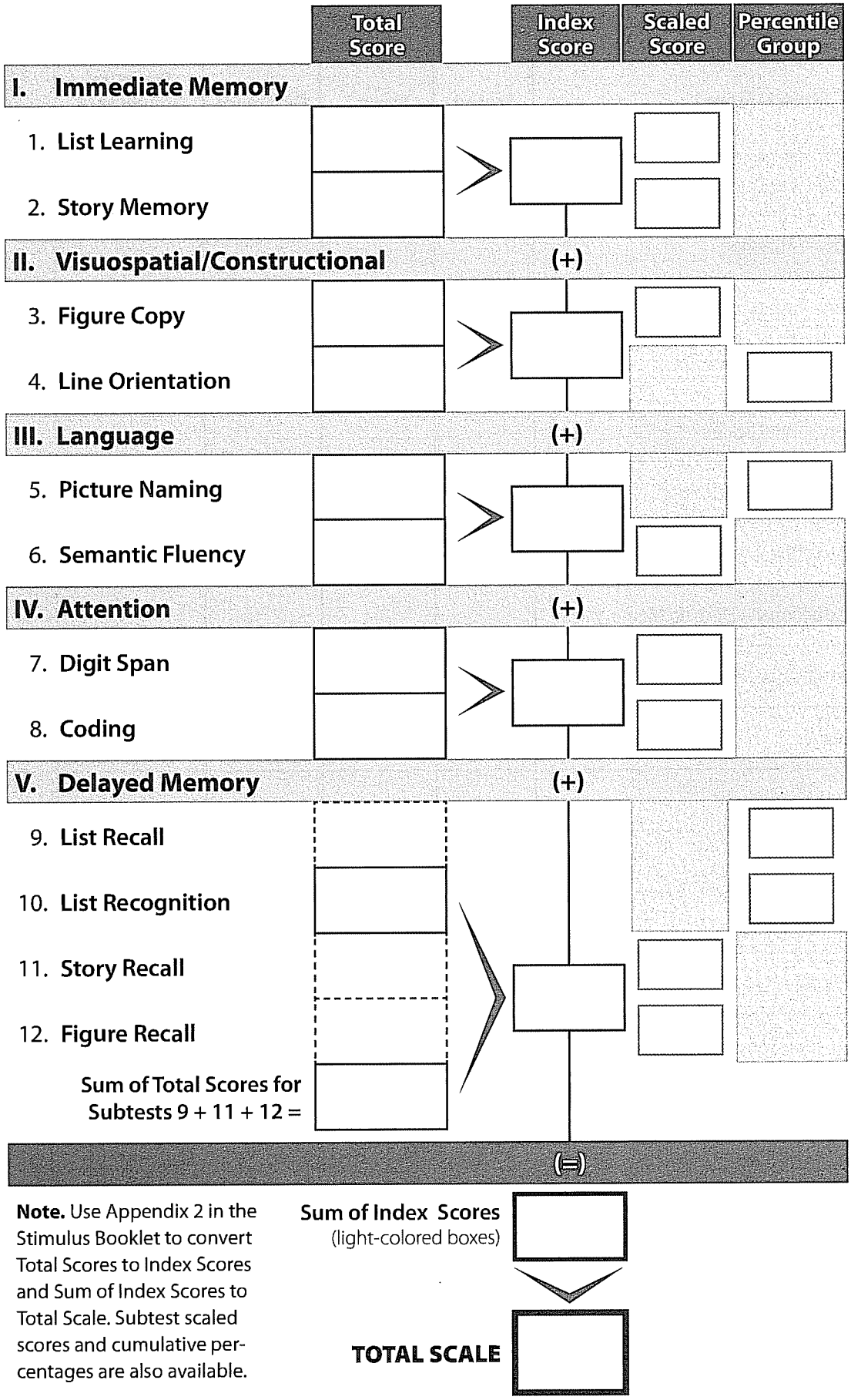
(Fold back for use.)

Supplemental Discrepancy Analysis Page

Index Differences

Score 1–Score 2	Score 1	Score 2	Difference	Statistical Significance _____Level	Frequency of Difference in Standardization Sample
Immediate Memory—Visuospatial/Constructional					
Immediate Memory—Attention					
Immediate Memory—Language					
Immediate Memory—Delayed Memory					
Immediate Memory—Total Scale					
Visuospatial/Constructional—Attention					
Visuospatial/Constructional—Language					
Visuospatial/Constructional—Delayed Memory					
Visuospatial/Constructional—Total Scale					
Attention—Language					
Attention—Delayed Memory					
Attention—Total Scale					
Language—Delayed Memory					
Language—Total Scale					
Delayed Memory—Total Scale					

Score Conversion Page



Note. Use Appendix 2 in the Stimulus Booklet to convert Total Scores to Index Scores and Sum of Index Scores to Total Scale. Subtest scaled scores and cumulative percentages are also available.

⊃	┘	∧	⊥	⊂	⊢	=	∨	+
1	2	3	4	5	6	7	8	9

SAMPLE__________________________________

=	⊢	⊂	∧	+	┘	⊥	⊃	∨	=	⊢	∧	⊃	+

⊥	⊃	∨	⊢	=	∧	⊂	+	┘	∧	⊥	⊂	+	┘

⊃	⊢	∧	=	∨	⊂	┘	+	⊥	=	⊃	∧	⊢	⊂

+	⊂	⊢	┘	=	⊢	+	∧	⊃	⊂	┘	⊥	+	⊢

⊂	+	⊢	⊃	∧	=	⊥	┘	⊂	=	+	∨	⊥	∧

∧	=	┘	⊢	+	∨	⊥	┘	∧	⊃	∨	⊥	⊂	┘

+	⊂	┘	⊃	∧	=	⊂	+	⊥	∨	┘	∧	⊃	=

Rivermead Post Concussion Symptoms Questionnaire

Modified (Rpq-3 And Rpq-13)[42] Printed With Permission: Modified Scoring System From Eyres 2005 [28]

Subject ID: Date:

After a head injury or accident some people experience symptoms that can cause worry or nuisance. We would like to know if you now suffer any of the symptoms given below. Because many of these symptoms occur normally, we would like you to compare yourself now with before the accident. For each symptom listed below please circle the number that most closely represents your answer.

0 = not experienced at all
1 = no more of a problem
2 = a mild problem
3 = a moderate problem
4 = a severe problem

Compared with **before** the accident, do you **now** (i.e., over the last 24 hours) suffer from:

	not experienced	no more of a problem	mild problem	moderate problem	severe problem
Headaches	0	1	2	3	4
Feelings of dizziness	0	1	2	3	4
Nausea and/or vomiting	0	1	2	3	4
Noise sensitivity (easily upset by loud noise)	0	1	2	3	4
Sleep disturbance	0	1	2	3	4
Fatigue, tiring more easily	0	1	2	3	4
Being irritable, easily angered	0	1	2	3	4
Feeling depressed or tearful	0	1	2	3	4
Feeling frustrated or impatient	0	1	2	3	4
Forgetfulness, poor memory	0	1	2	3	4
Poor concentration	0	1	2	3	4
Taking longer to think	0	1	2	3	4
Blurred vision	0	1	2	3	4
Light sensitivity (easily upset by bright light)	0	1	2	3	4
Double vision	0	1	2	3	4
Restlessness	0	1	2	3	4
Are you experiencing any other difficulties? Please specify, and rate as above.					
1.	0	1	2	3	4
2.	0	1	2	3	4

Administration only:

RPQ-3 *(total for first three items)*	
RPQ-13 *(total for next 13 items)*	

http://www.maa.nsw.gov.au/default.aspx?MenuID=148

Administration only

Individual item scores reflect the presence and severity of post concussive symptoms. Post concussive symptoms, as measured by the RPQ, may arise for different reasons subsequent to (although not necessarily directly because of) a traumatic brain injury. The symptoms overlap with broader conditions, such as pain, fatigue and mental health conditions such as depression[72].

The questionnaire can be repeated to monitor a patient's progress over time. There may be changes in the severity of symptoms, or the range of symptoms. Typical recovery is reflected in a reduction of symptoms and their severity within three months.

Scoring

The scoring system has been modified from Eyres, 2005[24].

The items are scored in two groups. The first group (RPQ-3) consists of the first three items (headaches, feelings of dizziness and nausea) and the second group (RPQ-13) comprises the next 13 items. The total score for RPQ-3 items is potentially 0–12 and is associated with early symptom clusters of post concussive symptoms. If there is a higher score on the RPQ-3, earlier reassessment and closer monitoring is recommended.

The RPQ-13 score is potentially 0–52, where higher scores reflect greater severity of post concussive symptoms. The RPQ-13 items are associated with a later cluster of symptoms, although the RPQ-3 symptoms of headaches, dizziness and nausea may also be present. The later cluster of symptoms is associated with having a greater impact on participation, psychosocial functioning and lifestyle. Symptoms are likely to resolve within three months. A gradual resumption of usual activities is recommended during this period, appropriate to symptoms. If the symptoms do not resolve within three months, consideration of referral for specialist assessment or treatment services is recommended.

References:

Eyres, S., Carey, A., Gilworth, G., Neumann, V., Tennant, A. (2005). Construct validity and reliability of the Rivermead Post Concussion Symptoms Questionnaire. *Clinical Rehabilitation*, 19, 878-887.

King, N. S., Crawford, S., Wenden, F.J., Moss, N.E.G. Wade, D.T. (1995). The Rivermead Post Concussion Symptoms Questionnaire: a measure of symptoms commonly experienced after head injury and its reliability *Journal of Neurology*, 242, 587-592.

Potter, S., Leigh, E., Wade, D., Fleminger, S. (2006). The Rivermead Post Concussion Symptoms Questionnaire *Journal of Neurology*, October 1-12.

http://www.maa.nsw.gov.au/default.aspx?MenuID=148

I. FEEDING AND EATING DISORDERS

ANOREXIA NERVOSA

ANOREXIA NERVOSA CRITERIA

SCREEN Q#12 **YES** | | **NO** I1

IF NO: GO TO ***BULIMIA NERVOSA*** I.4

IF SCREENING QUESTION #12 ANSWERED "NO," CHECK HERE ___ AND SKIP TO ***BULIMIA NERVOSA*** *I.4*

IF QUESTION #12 ANSWERED "YES": **You've said that there was a time when you weighed much less than other people thought you ought to weigh...**

IF SCREENER NOT USED: **Now I would like to ask you some questions about your eating habits and your weight. Have you ever had a time when you weighed much less than other people thought you ought to weigh?**

IF YES: **Why was that? How much did you weigh? How old were you then? How tall were you?**

A. Restriction of energy intake relative to requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. Significantly low weight is defined as a weight that is less than minimally normal or, for children and adolescents, less than minimally expected.

? 1 2 3 I2

GO TO ***BULIMIA NERVOSA*** I.4

IF LIFETIME RATING OF "3": **During the past 3 months, since** (3 MONTHS AGO), **what is the lowest your weight has been?**

Past 3 months ? 1 2 3 I3

At that time, were you very afraid that you could become fat?

IF NO: **Tell me about your eating habits. (Have you avoided high calorie foods or high fat foods? How strict are you about it? Have you ever thrown up after you eaten? How often? Do you exercise a lot after you eat?)**

B. Intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain, even though underweight.

? 1 2 3 I4

GO TO ***BULIMIA NERVOSA*** I.4

IF LIFETIME RATING OF "3": **Has this also been the case during the past 3 months, since** (3 MONTHS AGO)**?**

Past 3 months ? 1 2 3 I5

At your lowest weight, did you still feel too fat or that part of your body was too fat?

IF NO: **Did you need to be very thin in order to feel better about yourself?**

IF NO AND LOW WEIGHT IS MEDICALLY SERIOUS: **When you were that thin, did anybody tell you it could be dangerous to your health to be that thin? (What did you think?)**

C. Disturbance in the way in which one's body weight or shape is experienced; undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

? 1 2 3 I6

GO TO ***BULIMIA NERVOSA*** I.4

IF LIFETIME RATING OF "3": **Has this also been the case in the past 3 months, since** (3 MONTHS AGO)**?**

Past 3 months ? 1 2 3 I7

ANOREXIA NERVOSA CRITERIA A, B, AND C ARE CODED "3"

1 3 I8

IF NO: GO TO ***BULIMIA NERVOSA*** I.4

ANOREXIA NERVOSA

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

ANOREXIA NERVOSA CHRONOLOGY

ANOREXIA NERVOSA CRITERIA A, B, AND C ARE CODED "3" FOR THE PAST 3 MONTHS

? 1 3 I9

PAST ANOREXIA NERVOSA	CURRENT ANOREXIA NERVOSA

Indicate **current severity** by circling the appropriate number. (The level of severity may be increased to reflect clinical symptoms, the degree of functional disability, and the need for supervision.)

1 - **Mild:** BMI ≥ 17 kg/m^2 I10
2 - **Moderate:** BMI 16-16.99 kg/m^2
3 - **Severe:** BMI 15-15.99 kg/m^2
4 - **Extreme:** BMI < 15 kg/m^2

(Refer to Page I.12 for chart to help in determining Body Mass Index)

CONTINUE WITH ***AGE AT ONSET*** NEXT PAGE.

Indicate **type** of remission by circling the appropriate number:

1 - **In partial remission:** After full criteria for Anorexia Nervosa were previously met, Criterion A (low body weight) has not been met for a sustained period, but either Criterion B (intense fear of gaining weight or becoming fat or behavior that interferes with weight gain) or Criterion C (disturbances in self-perception of weight and shape) is still met. I11
2 - **In full remission:** After full criteria for Anorexia Nervosa were previously met, none of the criteria have been met for a sustained period of time.

When did you last have (ANY SXS OF ANOREXIA NERVOSA)? Number of months prior to interview when last had a symptom of Anorexia Nervosa ____ ____ ____ I12

AGE AT ONSET

IF UNKNOWN: **How old were you when you first started having** (SXS OF ANOREXIA NERVOSA)**?**

Age-at-onset of Anorexia Nervosa (CODE 99 IF UNKNOWN).

____ ____ I13

*IF ANOREXIA NERVOSA IS NOT CURRENT**, GO TO *BULIMIA NERVOSA** I.4.*

Do you have eating binges in which you eat a lot of food in a short period of time and feel that your eating is out of control? (How often?)

IF NO: **What kinds of things have you done to keep weight off? (Do you ever make yourself vomit or take laxatives, enemas, or water pills? How often?)**

*Specify **subtype** for current episode:* (circle the appropriate number)

I14

1 – **Restricting type:**

During the last 3 months, the individual has NOT engaged in recurrent episodes of binge eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas). This subtype describes presentations in which weight loss is accomplished primarily through dieting, fasting and/or excessive exercise.

2 – **Binge-eating/purging type:**

During last 3 months, the individual has engaged in recurrent episodes or binge-eating or purging behavior (i.e., self-induced vomiting or misuse of laxatives, diuretics, or enemas).

BULIMIA NERVOSA

BULIMIA NERVOSA CRITERIA

SCREEN Q#13 **YES** | **NO** I15

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

IF SCREENING QUESTION #13 IS ANSWERED "NO," GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** *I.10 OR GO TO* ***ARFID*** *Opt-I.1.*

IF QUESTION #13 ANSWERED "YES": **You've said that you've had eating binges, that is, times when you couldn't resist eating a lot of food or stop eating once you've started. Tell me about those times.**

IF SCREENER NOT USED: **Have you had eating binges, that is, times when you couldn't resist eating a lot of food or stop eating once you started? Tell me about those times.**

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by BOTH of the following:

During these times, were you unable to control what or how much you were eating?

2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)

NOTE: Criterion A.2 (lack of control) precedes criterion A.1 to tie in with screening question.

? 1 2 3 I16

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

During those times, how much did you eat? Over what period of time? What's the most you might eat at such times? (Does this only happen during celebrations or holidays?)

1. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances

? 1 2 3 I17

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

CRITERIA A.2 AND A.1 ARE CODED "3" 1 3 I18

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

IF LIFETIME RATING OF "3" FOR BOTH CRITERIA A.2 AND A.1: **During the past 3 months, since** (3 MONTHS AGO)**, have you had such episodes?**

Past 3 months ? 1 2 3 I19

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

Have you ever done anything to keep yourself from gaining weight because of the binge eating (like making yourself vomit, taking laxatives, enemas, water pills, or thyroid hormone, strict dieting or fasting, or exercising a lot)? Tell me about that. How often did this occur?

B. Recurrent inappropriate compensatory behavior in order to prevent weight gain, such as: self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.

? 1 2 3 I20

GO TO ***BINGE-EATING DISORDER*** I.7

IF LIFETIME RATING OF "3": **Have you done** (COMPENSATORY BEHAVIOR[S]) **during the past 3 months, since** (3 MONTHS AGO)**?**

Past 3 months
1 3 I21

How often were you binge eating and (COMPENSATORY BEHAVIOR[S])**? (At least once a week for at least 3 months?)**

C. The binge eating and inappropriate compensatory behaviors both occur, on average, at least once a week for 3 months.

? 1 2 3 I22

GO TO ***BINGE-EATING DISORDER*** I.7

IF LIFETIME RATING OF "3": **Since** (3 MONTHS AGO), **how often were you binge eating and** (COMPENSATORY BEHAVIOR[S])**? At least once a week?**

Past 3 months
1 3 I23

Has your body shape and weight ever been an important factor in how you felt about yourself?

IF YES: **How important?**

D. Self-evaluation is unduly influenced by body shape and weight.

? 1 2 3 I24

IF LIFETIME RATING OF "3": **Has this also been the case during the past 3 months?**

Past 3 months
1 3 I25

IF UNKNOWN: **Do you binge eat and then** (ENGAGE IN COMPENSATORY BEHAVIOR) **only when your weight is very low?**

E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

? 1 3 I26

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

BULIMIA NERVOSA CRITERIA
A, B, C, D, AND E ARE CODED "3."

1 3 I27

BULIMIA NERVOSA

GO TO ***OTHER SPECIFIED FEEDING OR EATING ODISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

BULIMIA NERVOSA CHRONOLOGY

BULIMIA NERVOSA CRITERIA A, B, C, AND D ARE MET FOR THE PAST 3 MONTHS

? 1 3 I28

PAST BULIMIA NERVOSA

CURRENT BULIMIA NERVOSA

Indicate **current severity** by circling appropriate number: (The level of severity may be increased to reflect other symptoms and the degree of functional disability.)

1 - **Mild:** An average of 1–3 episodes of inappropriate compensatory behaviors per week. I29

2 - **Moderate:** An average of 4–7 episodes of inappropriate compensatory behaviors per week.

3 - **Severe:** An average of 8–13 episodes of inappropriate compensatory behaviors per week.

4 – **Extreme:** An average of 14 or more episodes of inappropriate compensatory behaviors per week.

CONTINUE WITH ***AGE AT ONSET*** BELOW.

Indicate **type** of remission by circling the appropriate number:

I30

1 - **In partial remission:** After full criteria for bulimia nervosa were previously met, some, but not all, of the criteria have been met for a sustained period of time

2 - **In full remission:** After full criteria for bulimia nervosa were previously met, none of the criteria have been met for a sustained period of time.

When did you last have (ANY SXS OF BULIMIA NERVOSA)? Number of months prior to interview when last had a symptom of Bulimia Nervosa ____ ____ ____ I31

AGE AT ONSET

IF UNKNOWN: **How old were you when you first started having** (SXS OF BULIMIA NERVOSA)**?** Age at onset of Bulimia Nervosa (CODE 99 IF UNKNOWN) ____ ____ I32

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

BINGE-EATING DISORDER

BINGE-EATING DISORDER CRITERIA

During these binges did you...

NOTE: Criterion A has already been rated "3" in the context of the Bulimia Nervosa evaluation, page I.4.

B. The binge-eating episodes are associated with three (or more) of the following:

...eat much more rapidly than normal?

1. Eating much more rapidly than normal. ? 1 2 3 I33

IF LIFETIME RATING OF "3" AND CURRENTLY BINGE EATING: **Has this also been the case during the past 3 months?**

Past 3 months 1 3 I34

...ever eat until you felt uncomfortably full?

2. Eating until feeling uncomfortably full. ? 1 2 3 I35

IF LIFETIME RATING OF "3" AND CURRENTLY BINGE EATING: **Has this also been the case during the past 3 months?**

Past 3 months 1 3 I36

...ever eat large amounts of food when you didn't feel physically hungry?

3. Eating large amounts of food when not feeling physically hungry. ? 1 2 3 I37

IF LIFETIME RATING OF "3" AND CURRENTLY BINGE EATING: **Has this also been the case during the past 3 months?**

Past 3 months 1 3 I38

...ever eat alone because you were embarrassed by how much you were eating?

4. Eating alone because of being embarrassed by how much one is eating. ? 1 2 3 I39

IF LIFETIME RATING OF "3" AND CURRENTLY BINGE EATING: **Has this also been the case during the past 3 months?**

Past 3 months 1 3 I40

...ever feel disgusted with yourself, depressed, or feel very guilty after overeating?

5. Feeling disgusted with oneself, depressed or very guilty afterward. ? 1 2 3 I41

IF LIFETIME RATING OF "3" AND CURRENTLY BINGE EATING: **Has this also been the case during the past 3 months?**

Past 3 months 1 3 I42

AT LEAST 3 "B" SXS CODED "3." 1 3 I43

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10 ***OR*** GO TO ***ARFID*** Opt-I.1

AT LEAST 3 "B" SXS CODED 3 FOR PAST 3 MONTHS 1 3 I44

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

Was it very upsetting to you that you couldn't stop eating or control what or how much you were eating?

C. Marked distress regarding binge eating is present.

? 1 2 3 I45

GO TO ***OTHER SPECIFIED FEEDIN OR EATING DISORDER*** I.10
OR GO TO
ARFID Opt-I.1

IF LIFETIME RATING OF "3" AND CURRENTLY BINGE EATING: **For the past 3 months, since** (3 MONTHS AGO), **has this still been the case?**

Past 3 months
1 3 I46

IF UNKNOWN: **How often did you binge eat? (For how long a period of time? At least once a week for at least 3 months?)**

D. The binge eating occurs, on average, at least once a week for 3 months.

? 1 2 3 I47

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10
OR GO TO
ARFID Opt-I.1

IF LIFETIME RATING OF "3" AND CURRENTLY BINGE EATING: **How often have you been binge eating since** (3 MONTHS AGO)**? (At least once a week?)**

Past 3 months
1 3 I48

IF UNKNOWN OR UNCLEAR: **Did you ever do anything to keep yourself from gaining weight because of the binge eating (like making yourself vomit, taking laxatives, enemas, water pills, or thyroid hormone, strict dieting or fasting, or exercising a lot)?**

IF UNKNOWN: **Do you binge eat only when your weight is very low?**

IF LIFETIME RATING OF "3," CURRENTLY BINGE EATING AND UNCLEAR: **During the past 3 months, since** (3 MONTHS AGO)**, have you done anything to keep yourself from gaining weight because of the binge eating (like making yourself vomit, taking laxatives, enemas, water pills, or thyroid hormone, strict dieting or fasting, or exercising a lot)?**

E. The binge eating is not associated with the recurrent use of inappropriate compensatory behaviors as in Bulimia Nervosa and does not occur exclusively during the course of Bulimia Nervosa or Anorexia Nervosa.

NOTE: Code "3" if no recurrent inappropriate compensatory behaviors.

? 1 3 I49

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10
OR GO TO
ARFID Opt-I.1

Past 3 months
1 3 I50

BINGE-EATING DISORDER CRITERIA A, B, C, D, AND E ARE CODED "3."

NOTE: Criterion A for Binge-Eating Disorder has already been coded "3" as part of the assessment for Bulimia Nervosa, I.4.

1 3 I51

BINGE-EATING DISORDER

GO TO ***OTHER SPECIFIED FEEDING OR EATING DISORDER*** I.10
OR GO TO
ARFID Opt-I.1

BINGE-EATING DISORDER CHRONOLOGY

BINGE-EATING DISORDER CRITERIA A, B, C, D, AND E ARE CODED "3" FOR THE PAST 3 MONTHS. ? 1 3 I52

PAST BINGE-EATING DISORDER

CURRENT BINGE-EATING DISORDER

*Indicate **current severity:** (*circle the appropriate number)

(The level of severity may be increased to reflect other symptoms and the degree of functional disability.)

I53

1 - **Mild:** 1–3 binge-eating episodes per week

2 - **Moderate:** 4–7 binge-eating episodes per week

3 - **Severe**: 8–13 binge-eating episodes per week

4 – **Extreme:** 14 or more binge-eating episodes per week

CONTINUE WITH ***AGE AT ONSET*** BELOW.

*Indicate **type** of remission*: (circle the appropriate number)

1 - **In partial remission:** After full criteria for Binge-Eating Disorder were previously met, binge eating occurs at an average frequency of less than one episode per week for a sustained period of time. I54

2 - **In full remission:** After full criteria for Binge-Eating Disorder were previously met, none of the criteria have been met for a sustained period of time.

When did you last have (ANY SXS OF BINGE-EATING DISORDER)**?** Number of months prior to interview when last had a symptom of Binge-Eating Disorder ____ ____ ____ I55

AGE AT ONSET

IF UNKNOWN: **How old were you when you first started having** (SXS OF BINGE-EATING DISORDER)**?** Age at onset of Binge-Eating Disorder (CODE 99 IF UNKNOWN) ____ ____ I56

OTHER SPECIFIED FEEDING OR EATING DISORDER

OTHER SPECIFIED FEEDING OR EATING DISORDER

Symptoms characteristic of a Feeding and Eating Disorder predominate but do not meet the full criteria for any of the disorders in the Feeding and Eating Disorders diagnostic class.

1 3 I57

GO TO NEXT MODULE

IF UNKNOWN: **What effect have** (EATING SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION:

How have (EATING SXS) **affected your relationships or your interactions with other people? (Have** [EATING SXS] **caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (EATING SXS) **affected your school/work? (How about your attendance at work or school? Have** [EATING SXS] **made it more difficult to do your work/schoolwork? How have** [EATING SXS] **affected the quality of your work/schoolwork?)**

How have (EATING SXS) **affected your ability to take care of things at home? How about doing other things that were important to you like religious activities, physical exercise, or hobbies? Have you avoided doing anything because you felt like you weren't up to it?**

Have (EATING SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much were you bothered or upset by having** (EATING SXS)**?**

[Symptoms] cause clinically significant distress or impairment in social, occupational, or other important areas of functioning

? 1 2 3 I58

GO TO NEXT MODULE

OTHER SPECIFIED EATING DISORDER

IF UNCLEAR: **During the past month, since** (1 MONTH AGO)**, have you had** (SXS OF EATING DISORDER)**?**

Check here ___ if present in the past month. I59

CONTINUE WITH TYPE ON NEXT PAGE

*Indicate **type** of Other Specified Eating Disorder*: (circle the appropriate number)

1 - **Atypical anorexia nervosa:** All of the criteria for Anorexia Nervosa are met, except that despite significant weight loss, the individual's weight is within or above the normal range. I60

2 - **Bulimia nervosa (of low frequency and/or limited duration):** All of the criteria for Bulimia Nervosa are met, except that the binge eating and inappropriate compensatory behaviors occur, on average, less than once a week and/or for less than 3 months.

3 - **Binge-eating disorder (of low frequency and/or limited duration):** All of the criteria for Binge-Eating Disorder are met, except that the binge eating occurs, on average, less than once a week and/or for less than 3 months.

4 - **Purging disorder**: Recurrent purging behavior to influence weight or shape (e.g., self-induced vomiting; misuse of laxatives, diuretics, or other medications) in the absence of binge eating.

5 - **Night eating syndrome**: Recurrent episodes of night eating, as manifested by eating after awakening from sleep or by excessive food consumption after the evening meal. There is awareness and recall of the eating. The night eating is not better explained by external influences such as changes in the individual's sleep-wake cycle or by local social norms. The night eating causes significant distress and/or impairment in functioning. The disordered pattern of eating is not better explained by Binge-Eating Disorder or another mental disorder, including substance use, and is not attributable to another medical disorder or to an effect of medication.

6 - **Other**: _____

7 - **Unspecified**: There is insufficient information to make a more specific diagnosis.

TABLE FOR DETERMINING SEVERITY OF ANOREXIA NERVOSA BASED ON BODY MASS INDEX

Anorexia Nervosa Severity	**Mild (BMI≥17)**	**Moderate (BMI=16-16.99)**	**Severe (BMI=15-15.99)**	**Extreme (BMI=<15)**
Height cms (inches/feet)	Body Weight kg (pounds)	Body Weight kg (pounds)	Body Weight kg (pounds)	Body Weight kg (pounds)
148 (58" / 4´10")	≥38 (≥84)	35-37 (77-82)	33-34 (72-76)	<33 (<72)
150 (59" / 4´11")	≥39 (≥86)	37-38 (79-81)	35-36 (74-78)	<35 (<74)
153 (60" / 5´)	≥40 (≥90)	38-39 (84-87)	36-37 (77-81)	<36 (<77)
155 (61" / 5´1")	≥41 (≥95)	39-40 (86-90)	37-38 (80-85)	<37 (<80)
158 (62" / 5´2")	≥43 (≥95)	41-42 (89-93)	38-39 (82-88)	<38 (<82)
160 (63" / 5´3")	≥44 (≥97)	42-43 (92-96)	39-40 (85-91)	<39 (<85)
163 (64" / 5´4")	≥46 (≥101)	44-45 (97-99)	40-41 (88-92)	<40 (<88)
165 (65" / 5´5")	≥47 (≥104)	45-46 (100-102)	41-43 (91-95)	<41 (<91)
168 (66" / 5´6")	≥48 (≥106)	46-47 (100-105)	43-44 (93-99)	<43 (<93)
170 (67" / 5´7")	≥49 (≥108)	47-48 (103-107)	44-46 (95-102)	<44 (<95)
173 (68" / 5´8")	≥51 (≥112)	49-50 (104-109)	46-47 (97-103)	<46 (<97)
175 (69" / 5´9")	≥52 (≥115)	50-51 (106-113)	47-48 (99-105)	<47 (<99)
178 (70" / 5´10")	≥54 (≥119)	52-53 (109-116)	48-50 (102-108)	<48 (<102)
180 (71" / 5´11")	≥55 (≥121)	53-54 (115-123)	51-52 (108-114)	<51 (<108)
183 (72" / 6´0")	≥57 (≥126)	54-55 (119-125)	52-53 (111-118)	<52 (<111)
185 (73" / 6´1")	≥58 (≥128)	55-57 (124-129)	53-54 (114-121)	<53 (<114)
188 (74" / 6´2")	≥60 (≥132)	57-59 (125-132)	54-55 (117-124)	<54 (<117)
191 (75" / 6´3")	≥61 (≥134)	59-60(128-136)	55-58 (122-127)	<55 (<122)
193 (76" / 6´4")	≥63 (≥140)	60-62 (132-140)	58-59 (123-131)	<58 (<123)
Severity	**Mild**	**Moderate**	**Severe**	**Extreme**

Source: Adapted from *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report.*

A. MOOD EPISODES

NOTE: This module is for evaluating Current and Past Mood Episodes, Cyclothymic Disorder, Persistent Depressive Disorder (Dysthymia), AND Premenstrual Dysphoric Disorder. Bipolar I Disorder, Bipolar II Disorder, Other Specified Bipolar Disorder, Major Depressive Disorder, and Other Specified Depressive Disorder are diagnosed in Module D.

CURRENT MAJOR DEPRESSIVE EPISODE

Now I am going to ask you some more questions about your mood.

MAJOR DEPRESSIVE EPISODE CRITERIA

A. Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood, or (2) loss of interest or pleasure.

Since (1 MONTH AGO)**, has there been a period of time when you were feeling depressed or down <u>most of the day nearly every day</u>? (Has anyone said that you look sad, down, or depressed?)**

IF NO: **What about feeling empty or hopeless most of the day nearly every day?**

IF YES TO EITHER OF ABOVE: **What has that been like? How long has it lasted? (As long as 2 weeks?)**

1. Depressed mood most of the day, nearly every day, as indicated either by subjective report (e.g., feels sad, empty, hopeless) or observation made by others (e.g., appears tearful). NOTE: in children or adolescents, can be irritable mood.

? 1 2 3 A1

IF PREVIOUS ITEM CODED "3:" **During that time, did you lose interest or pleasure in things you usually enjoyed? (What has that been like? Give me some examples.)**

IF PREVIOUS ITEM NOT CODED "3:" **What about a time since** (1 MONTH AGO) **when you lost interest or pleasure in things you usually enjoyed? (What has that been like? Give me some examples.)**

IF YES: **Has it been nearly every day? How long has it lasted? (As long as 2 weeks?)**

2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated either by subjective account or observation).

? 1 2 3 A2

IF NEITHER ITEM A.1 NOR A.2 IS CODED "3," GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

FOR THE FOLLOWING QUESTIONS, FOCUS ON THE WORST 2 WEEKS IN THE PAST MONTH (OR ELSE THE PAST 2 WEEKS IF EQUALLY DEPRESSED FOR ENTIRE MONTH).

NOTE: When rating the following items, code "1" if the symptoms are clearly due to a general medical condition (e.g., insomnia due to severe back pain).

IF UNKNOWN: **Since** (1 MONTH AGO)**, during which 2-week period would you say you have been doing the worst?**

During (2-WEEK PERIOD)**...**

...how has your appetite been? (What about compared to your usual appetite? Have you had to force yourself to eat? Eat [less/more] than usual? Has that been nearly every day? Have you lost or gained any weight? How much? *IF YES*: **Have you been trying to [lose/gain] weight?)**	3. Significant weight loss when not dieting, or weight gain (e.g., a change of more than 5% of body weight in a month) or decrease or increase in appetite nearly every day. NOTE: in children, consider failure to make expected weight gains. *Check if*: ____ weight loss or decreased appetite ____ weight gain or increased appetite	?	1	2	3	A3 A4 A5
...how have you been sleeping? (Trouble falling asleep, waking frequently, trouble staying asleep, waking too early, OR sleeping too much? How many hours of sleep [including naps] have you been getting? How many hours of sleep did you typically get before you got [**depressed**/OWN WORDS]**? <u>Has it been nearly every night?)</u>**	4. Insomnia or hypersomnia nearly every day. *Check if*: ____ insomnia ____ hypersomnia	?	1	2	3	A6 A7 A8
...have you been so fidgety or restless that you were unable to sit still? What about the opposite—talking more slowly, or moving more slowly than is normal for you, as if you're moving through molasses or mud? (In either instance, has it been so bad that other people have noticed it? What have they noticed? <u>Has that been nearly every day?)</u>	5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down) NOTE: Consider behavior during the interview. *Check if*: ____ psychomotor agitation ____ psychomotor retardation	?	1	2	3	A9 A10 A11
...what has your energy level been like? **(Tired all the time? <u>Nearly every day?)</u>**	6. Fatigue or loss of energy nearly every day.	?	1	2	3	A12
...have you been feeling worthless? **What about feeling guilty about things you have done or not done?** *IF YES*: **What things? (Is this only because you can't take care of things since you have been sick?)** *IF YES TO EITHER OF ABOVE:* **<u>Nearly every day?</u>**	7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick) *Check if*: ____ worthlessness ____ inappropriate guilt	?	1	2	3	A13 A14 A15
...have you had trouble thinking or concentrating? Has it been hard to make decisions about everyday things? (What kinds of things has it been interfering with? <u>Nearly every day?)</u>	8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).	?	1	2	3	A16

...have things been so bad that you thought a lot about death or that you would be better off dead? Have you thought about taking your own life?

IF YES: **Have you done something about it? (What have you done? Have you made a specific plan? Have you taken any action to prepare for it? Have you actually made a suicide attempt?)**

9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide. ? 1 2 3 A17

NOTE: Code "1" for self-mutilation without suicidal intent.

Check if:

___ thoughts of own death A18
___ suicidal ideation A19
___ specific plan A20
___ suicide attempt A21

NOTE: Any current suicidal thoughts, plans, or actions should be thoroughly assessed by the clinician and action taken if necessary.

AT LEAST FIVE OF THE ABOVE SXS (A.1–A.9) ARE CODED "3" AND AT LEAST ONE OF THESE IS ITEM A.1 OR A.2. 3 A22

1

GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

IF UNKNOWN: **What effect have** (DEPRESSIVE SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION B:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Has this caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Did** [DEPRESSIVE SXS] **make it more difficult to do your work/schoolwork? How have** [DEPRESSIVE SXS] **affected the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? What about doing other things that are important to you like religious activities, physical exercise, or hobbies? Have you avoided doing anything because you felt like you weren't up to it?**

Have (DEPRESSIVE SXS) **affected any other important part of your life?**

IF DOES NOT INTERFERE WITH LIFE: **How much have you been bothered or upset by having** (DEPRESSIVE SXS)**?**

B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. ? 1 2 3 A23

1

GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

IF UNKNOWN: **When did** (EPISODE OF DEPRESSION) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

C. [Primary Depressive Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition.

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE/MEDICATION), GO TO ***GMC/SUBSTANCE*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

Etiological medical conditions include: stroke, Huntington's disease, Parkinson's disease, traumatic brain injury, Cushing's disease, hypothyroidism, multiple sclerosis, systemic lupus erythematosus.

Etiological substances/medications include: alcohol (I/W), phencyclidine (I), hallucinogens (I), inhalants (I), opioids (I/W), sedative, hypnotics or anxiolytics (I/W), amphetamine and other stimulants (I/W), cocaine (I/W), antiviral agents (etavirenz), cardiovascular agents (clonodine, guanethidine, methyldopa, reserpine), retinoic acid derivatives (isotretinoin), antidepressants, anticonvulsants, anti-migraine agents (triptans), antipsychotics, hormonal agents (corticosteroids, oral contraceptives, gonadotropin-releasing hormone agonists, tamoxifen), smoking cessation agents (varenicline) and immunological agents (interferon).

A24

? 1 3

DUE TO SUBSTANCE USE OR GMC, GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

PRIMARY DEPRESSIVE EPISODE

CONTINUE WITH NEXT ITEM

MAJOR DEPRESSIVE EPISODE CRITERIA A, B, AND C ARE CODED "3."

A25

1 3

GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

CURRENT MAJOR DEPRESSIVE EPISODE

How many separate times in your life have you been (**depressed**/OWN WORDS) **nearly every day for at least 2 weeks and had several of the symptoms that you described, like** (SXS OF CURRENT MDE)**?**

Total number of Major Depressive Episodes, including current (CODE 99 IF TOO NUMEROUS OR INDISTINCT TO COUNT).

A26

_____ _____

GO TO ***CURRENT MANIC EPISODE*** A.10

PAST MAJOR DEPRESSIVE EPISODE

NOTE: IF CURRENTLY DEPRESSED MOOD OR LOSS OF INTEREST BUT FULL CRITERIA ARE NOT MET FOR A MAJOR DEPRESSIVE EPISODE, SUBSTITUTE THE PHRASE **"Has there ever been ***another*** time..."** *IN EACH OF THE SCREENING QUESTIONS BELOW.*

Have you ***ever* had a period when you were feeling depressed or down most of the day nearly every day? (Did anyone say that you looked sad, down, or depressed?)**

IF NO: **How about feeling sad, empty or hopeless, most of the day nearly every day?**

IF YES TO EITHER OF ABOVE: **What was that like? When was that? How long did it last? (As long as 2 weeks?)**

IF PREVIOUS ITEM CODED "3": **During that time, did you lose interest or pleasure in things you usually enjoyed? (What was that like?)**

IF PREVIOUS ITEM NOT CODED "3": **Have you ever had a period when you lost interest or pleasure in things you usually enjoyed? (What was that like?)**

IF YES: **When was that? Was it nearly every day? How long did it last? (As long as 2 weeks?)**

Have you had more than one time like that? (Which time was the worst?)

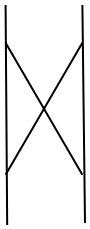
IF UNCLEAR: **Have you had any times like that in the past year, since** (1 YEAR AGO)**?**

MAJOR DEPRESSIVE EPISODE CRITERIA

A. Five or more of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms was either (1) depressed mood or (2) loss of interest or pleasure.

1. Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad, empty, hopeless) or observation made by others (e.g., appears tearful). NOTE: in children and adolescents, can be irritable mood.

? 1 2 3 A27



2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated either by subjective account or observation).

? 1 2 3 A28

IF NEITHER ITEM A.1 NOR A.2 IS CODED "3," GO TO ***CURRENT MANIC EPISODE*** A.10

NOTE: If there is evidence for more than one past episode, select the "worst" one for your inquiry about past Major Depressive Episode. If there was a likely Major Depressive Episode in the past year, ask about that episode even if it was not the worst.

FOR THE FOLLOWING QUESTIONS, FOCUS ON THE WORST 2 WEEKS OF THE PAST MAJOR DEPRESSIVE EPISODE THAT YOU ARE INQUIRING ABOUT.

NOTE: When rating the following items, code "1" if clearly directly due to a general medical condition (e.g., insomnia due to severe back pain).

During that (2-WEEK PERIOD)**...**

...how was your appetite? (What about compared to your usual appetite? Did you have to force yourself to eat? Eat [less/more] **than usual? <u>Was that nearly every day?</u> Did you lose or gain any weight? How much?** *IF YES*: **Were you trying to** [lose/gain] **weight?)**	3. Significant weight loss when not dieting, or weight gain (e.g., a change of more than 5% of body weight in a month) or decrease or increase in appetite nearly every day. *Check if*: ____ weight loss or decreased appetite ____ weight gain or increased appetite	?	1	2	3	A29 A30 A31
...**how were you sleeping? (Trouble falling asleep, waking frequently, trouble staying asleep, waking too early, OR sleeping too much? How many hours of sleep (including naps) had you been getting? How many hours of sleep did you typically get before you got** (**depressed**/OWN WORDS)**? <u>Has it been nearly every night?</u>**	4. Insomnia or hypersomnia nearly every day. *Check if*: ____ insomnia ____ hypersomnia	?	1	2	3	A32 A33 A34
...were you so fidgety or restless that you were unable to sit still? What about the opposite—talking more slowly, or moving more slowly than was normal for you, as if you were moving through molasses or mud? (In either instance, was it so bad that other people have noticed it? What did they notice? <u>Was that nearly every day?)</u>	5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down). *Check if*: ____ psychomotor agitation ____ psychomotor retardation	?	1	2	3	A35 A36 A37
...**what was your energy level like? (Tired all the time? <u>Nearly every day?</u>)**	6. Fatigue or loss of energy nearly every day	?	1	2	3	A38
...were you feeling worthless? **Did you feel guilty about things you had done or not done?** *IF YES*: **What things? (Was this only because you couldn't take care of things since you have been sick?)** *IF YES TO EITHER OF ABOVE:* **<u>Nearly every day?</u>**	7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick). *Check if*: ____ worthlessness ____ inappropriate guilt	?	1	2	3	A39 A40 A41
...did you have trouble thinking or concentrating? Was it hard to make decisions about everyday things? (What kinds of things did it interfere with?) <u>Nearly every day?</u>	8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).	?	1	2	3	A42

During that (2-WEEK PERIOD)**...**

...were things so bad that you thought a lot about death or that you would be better off dead? Did you think about taking your own life?

IF YES: **Did you do something about it? (What did you do? Did you make a specific plan? Did you take any action to prepare for it? Did you actually make a suicide attempt?)**

9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide. ? 1 2 3 A43

NOTE: Code "1" for self-mutilation without suicidal intent.

Check if:

___ thoughts of own death A44
___ suicidal ideation A45
___ specific plan A46
___ suicide attempt A47

AT LEAST FIVE OF THE ABOVE SXS (A.1–A.9) ARE CODED "3" AND AT LEAST ONE OF THESE IS ITEM A.1 OR A.2. 1 3 A48

IF NOT ALREADY ASKED: **Has there been any other time when you were** (**depressed**/OWN WORDS) **and had even more of the symptoms that I just asked you about?**

→ *IF YES: RETURN TO* ***PAST MAJOR DEPRESSIVE EPISODE*** *A.5, AND CHECK WHETHER THERE HAVE BEEN ANY OTHER MAJOR DEPRESSIVE EPISODES THAT WERE MORE SEVERE AND/OR CAUSED MORE SYMPTOMS. IF SO, ASK ABOUT THAT EPISODE.*

→ *IF NO: GO TO* ***CURRENT MANIC EPISODE*** *A.10.*

CONTINUE WITH NEXT ITEM, CRITERION B, NEXT PAGE

IF UNKNOWN: **What effect did** (DEPRESSIVE SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION B:

How did (DEPRESSIVE SXS) **affect your relationships or your interactions with other people? (Did this cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (DEPRESSIVE SXS) **affect your work/school? (How about your attendance at work or school? Did** [DEPRESSIVE SXS] **make it more difficult to do your work/schoolwork? How did** [DEPRESSIVE SXS] **affect the quality of your work/schoolwork?)**

How did (DEPRESSIVE SXS) **affect your ability to take care of things at home? (How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?)**

Did (DEPRESSIVE SXS) **affect any other important part of your life?**

IF DID NOT INTERFERE WITH LIFE: **How much were you bothered or upset by having** (DEPRESSIVE SXS)**?**

B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A49

*IF NO*T ALREADY ASKED: **Has there been any other time when you were** (**depressed**/OWN WORDS) **and it caused even more problems than the time I just asked you about?**

→ *IF YES: RETURN TO* ****PAST MAJOR DEPRESSIVE EPISODE**** *A.5, AND CHECK WHETHER THERE HAVE BEEN ANY OTHER MAJOR DEPRESSIVE EPISODES THAT WERE MORE SEVERE AND/OR CAUSED MORE SYMPTOMS. IF SO, ASK ABOUT THAT EPISODE.*

→ *IF NO: GO TO* ****CURRENT MANIC EPISODE**** *A.10.*

CONTINUE ON NEXT PAGE

IF UNKNOWN: **When did this period of (depression**/OWN WORDS**) begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

C. [Primary Depressive Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition (e.g., hypothyroidism).

? 1 3 A50

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

DUE TO SUBSTANCE USE OR GMC

PRIMARY DEPRESSIVE EPISODE

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.

IF UNKNOWN: **Has there been any other time when you were having** (DEPRESSIVE SXS) **like this but were not** (**using** SUBSTANCE/MEDICATION/**ill with** GMC)**?**

- *IF YES: GO TO* ***PAST MAJOR DEPRESSIVE EPISODE*** *A.5 AND CHECK WHETHER THERE HAS BEEN ANY OTHER MAJOR DEPRESSIVE EPISODE NOT DUE TO A SUBSTANCE/MEDICATION OR ANOTHER MEDICAL CONDITION. IF SO, ASK ABOUT THAT EPISODE.*
- *IF NO: GO TO* ***CURRENT MANIC EPISODE*** *A.10*

CONTINUE WITH NEXT ITEM

MAJOR DEPRESSIVE EPISODE CRITERIA A, B, AND C ARE CODED "3."

1 3 A51

GO TO ***CURRENT MANIC EPISODE*** A.10

PAST MAJOR DEPRESSIVE EPISODE

How old were you when (PAST MAJOR DEPRESSIVE EPISODE) **started?**

Age-at-onset of Past Major Depressive Episode coded above. ____ ____ A52

How many separate times in your life have you been (**depressed**/OWN WORDS) **nearly every day for at least 2 weeks and had several of the symptoms that you described like** (SXS OF WORST EPISODE)**?**

Total number of Major Depressive Episodes (CODE 99 IF TOO NUMEROUS OR INDISTINCT TO COUNT). ____ ____ A53

CURRENT MANIC EPISODE

Since (1 MONTH AGO)**, has there been a period of time when you were feeling so good, "high," excited, or "on top of the world" that other people thought you were not your normal self?**

→ *IF YES*: **What has it been like? (More than just feeling good?)**

Have you also been feeling like you were "hyper" or "wired" and had an unusual amount of energy? Have you been much more active than is typical for you? (Have other people commented on how much you have been doing?)

→ *IF NO*: **Since** (1 MONTH AGO)**, have you had a period of time when you were feeling irritable, angry, or short-tempered most of the day, nearly every day, for at least several days? What has it been like? (Is that different from the way you usually are?)**

IF YES: **Have you also been feeling like you were "hyper" and had an unusual amount of energy? Have you been much more active than is typical for you? (Have other people commented on how much you have been doing?)**

How long has this lasted? (As long as 1 week?)

IF LESS THAN 1 WEEK: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

Have you been feeling (high/irritable/OWN WORDS) **for most of the day, nearly every day during this time?**

FOCUS ON THE MOST SEVERE WEEK IN THE PAST MONTH OF THE CURRENT EPISODE FOR THE FOLLOWING QUESTIONS.

IF UNCLEAR: **During** (EPISODE)**, when were you the most (high/irritable**/OWN WORDS)**?**

During that time...

...how did you feel about yourself?

(More self-confident than usual? Did you feel much smarter or better than everyone else? Did you feel like you had any special powers or abilities?)

...did you need less sleep than usual? (How much sleep did you get?)

IF YES: **Did you still feel rested?**

MANIC EPISODE CRITERIA

A. A distinct period [lasting at least several days] of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased [...] activity or energy. ? 1 2 3 A54

→ GO TO ***PAST MANIC EPISODE*** A.18

Check if:

___ elevated, expansive mood A55

___ irritable mood A56

...lasting at least 1 week and present most of the day, nearly every day (or any duration if hospitalization is necessary). ? 1 2 3 A57

→ GO TO ***CURRENT HYPOMANIC EPISODE*** A.14

NOTE: If elevated mood lasts less than 1 week, check whether irritable mood lasts at least 1 week before skipping to A.14.

B. During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms have persisted (four if the mood is only irritable) and have been present to a significant degree and represent a noticeable change from usual behavior:

1. Inflated self-esteem or grandiosity. ? 1 2 3 A58

2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep). ? 1 2 3 A59

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

During that time...

...were you much more talkative than usual? (Did people have trouble stopping you or understanding you? Did people have trouble getting a word in edgewise?)	3. More talkative than usual or pressure to keep talking.	?	1	2	3	A60
...did you have thoughts racing through your head? (What was that like?)	4. Flight of ideas or subjective experience that thoughts are racing.	?	1	2	3	A61
...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)	5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli) as reported or observed.	?	1	2	3	A62
...how did you spend your time? (Work, friends, hobbies? Were you especially busy during that time?) **(Did you find yourself more enthusiastic at work or working harder at your job? What about being more engaged in school activities or studying harder?)** **(Were you more sociable during that time, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)** **(Were you spending more time thinking about sex or involved in doing something sexual, by yourself or with others? Was that a big change for you?)** **Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still? (How bad was it?)**	6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation (i.e., purposeless non-goal-directed activity). *Check if*: ___ increase in activity ___ psychomotor agitation	?	1	2	3	A63 A64 A65
...were you doing anything that could have caused trouble for you or your family? **(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)** **(Anything sexual that was likely to get you in trouble? Driving recklessly?)** **(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)**	7. Excessive involvement in activities that have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments).	?	1	2	3	A66

AT LEAST THREE "B" SXS ARE CODED "3" (FOUR IF MOOD ONLY IRRITABLE).

1 3 A67

GO TO ***PAST MANIC EPISODE*** A.18

C. The mood disturbance is sufficiently severe to cause marked impairment in social or occupational functioning or to necessitate hospitalization to prevent harm to self or others, or there are psychotic features.

? 1 2 3 A68

GO TO ***CURRENT HYPOMANIC CRITERION C*** A.16

NOTE: Code "3" if psychotic symptoms have been present. You may need to return here to recode after screening for psychotic symptoms in Module B.

DESCRIBE:

IF UNKNOWN: **What effect have these** (MANIC SXS) **had on your life?**

IF UNKNOWN: **Have you needed to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION C.

How have (MANIC SXS) **affected your relationships or your interactions with other people? (Have** (MANIC SXS) **caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (MANIC SXS) **affected your work/ school? (How about your attendance at work or school? Did** [MANIC SXS] **make it more difficult to do your work/ schoolwork? How have** [MANIC SXS] **affected the quality of your work/ schoolwork?)**

How have (MANIC SXS) **affected your ability to take care of things at home?**

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

D. [Primary Manic Episode:] The episode is not attributable to the physiological effects of a substance (i.e., a drug of abuse, medication) or to another medical condition.

A69

? 1 3

PRIMARY MANIC EPISODE

IF THERE IS ANY INDICATION THAT MANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF A GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.41 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

DUE TO SUBSTANCE USE OR GMC, GO TO ***PAST MANIC EPISODE*** A.18

NOTE: A full Manic Episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a Manic Episode and, therefore, a Bipolar I diagnosis.

CONTINUE WITH NEXT ITEM

Etiological medical conditions include: Alzheimer's disease, vascular dementia, HIV-induced dementia, Huntington's disease, Lewy body disease, Wernicke-Korsakoff, Cushing's disease, multiple sclerosis, ALS, Parkinson's disease, Pick's disease, Creutzfelt-Jakob disease, stroke, traumatic brain injuries, hyperthyroidism

Etiological substances/medications include: alcohol (I/W), phencyclidine (I), hallucinogens (I), sedatives, hypnotics, anxiolytics (I/W), amphetamines (I/W), cocaine (I/W), corticosteroids, androgens, isoniazid, levodopa, interferon alpha, varenicline, procarbazine, clarithromycin, ciprofloxacin

.

MANIC EPISODE CRITERIA A, B, C, AND D ARE CODED "3."

A70

1 3

GO TO ***PAST MANIC EPISODE*** A.18

CURRENT MANIC EPISODE

CURRENT HYPOMANIC EPISODE

HYPOMANIC EPISODE CRITERIA

IF CRITERIA ARE MET FOR A CURRENT MANIC EPISODE, CHECK HERE_____ AND GO TO ***PREMENSTRUAL DYSPHORIC DISORDER**** *A.36*. A71

Has the period when you were feeling (**high/irritable**/OWN WORDS)**, lasted for at least 4 days? Has it lasted for most of the day, nearly every day?**

A. A distinct period of abnormally and persistently elevated, expansive or irritable mood and abnormally and persistently increased activity or energy, lasting at least 4 consecutive days, and present most of the day, nearly every day. ? 1 2 3 A72

GO TO ***PAST MANIC EPISODE*** A.18

Check if:

___ elevated, expansive mood A73

___ irritable mood A74

Have you had more than one time like that since (1 MONTH AGO)**? (Which one was the most extreme?)**

FOCUS ON THE MOST EXTREME PERIOD IN THE PAST MONTH OF THE CURRENT EPISODE FOR THE FOLLOWING QUESTIONS.

B. During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms (four if the mood is only irritable) have persisted, represent a noticeable change from usual behavior, and have been present to a significant degree and represent a noticeable change from usual behavior:

(During that time...)

...how were you feeling about yourself? (More self-confident than usual?) (Did you feel much smarter or better than everyone else?) (Did you feel like you had any special powers or abilities?)

1. Inflated self-esteem or grandiosity. ? 1 2 3 A75

...did you need less sleep than usual? (How much sleep were you getting?)

IF YES: **Were you still feeling rested?**

2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep). ? 1 2 3 A76

...were you much more talkative than usual? (Did people have trouble stopping you, understanding you, or getting a word in edgewise?)

3. More talkative than usual or pressure to keep talking. ? 1 2 3 A77

...did you have thoughts racing through you head? (What was that like?)

4. Flight of ideas or subjective experience that thoughts are racing. ? 1 2 3 A78

...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)

5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli), as reported or observed. ? 1 2 3 A79

During that time...

...how were you spending your time? (Work, friends, hobbies? Were you been especially productive or busy?

(Were you finding yourself more enthusiastic at work or working harder at your job? What about being more engaged in school activities or studying harder?)

(Were you more sociable, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)

(Were you spending more time thinking about sex or doing something sexual, by yourself or with others? Was this a big change for you?)

Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still? (How bad was it?)

6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation. ? 1 2 3 A80

Check if:

___ increase in activity A81
___ psychomotor agitation A82

...were you doing anything that could have caused trouble for you or your family?

(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)

(Anything sexual that was likely to get you in trouble? Driving recklessly?)

(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)

7. Excessive involvement in activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments) ? 1 2 3 A83

AT LEAST THREE "B" SXS ARE CODED "3" (FOUR IF MOOD ONLY IRRITABLE). 1 3 A84

NOTE: Because of the inherent difficulty in distinguishing normal periods of good mood from hypomania, review all items coded "3" in criterion B and recode any equivocal judgments.

GO TO ***PAST MANIC EPISODE*** A.18

CURRENT HYPOMANIC CRITERION C

IF UNKNOWN: **Was this very different from the way you usually are when you're not** (**high/irritable**/OWN WORDS)**? (How were you different? At work? With friends?)**

C. The episode is associated with an unequivocal change in functioning that is uncharacteristic of the individual when not symptomatic.

? 1 2 3 A85

→ GO TO ***PAST MANIC EPISODE*** A.18

IF UNKNOWN: **Did other people notice the change in you? (What did they say?)**

D. The disturbance in mood and the change in functioning are observable by others.

? 1 2 3 A86

→ GO TO ***PAST MANIC EPISODE*** A.18

IF UNKNOWN: **What effect have these** (HYPOMANIC SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS <u>AS NEEDED</u> TO RATE CRITERION E.

How have (HYPOMANIC SXS) **affected your relationships or your interactions with other people? (Has this caused any problems in your relationships with your family, romantic partner or friends?)**

How have (HYPOMANIC SXS) **affected your school/work? (How about your attendance at work or school? Did** [HYPOMANIC SXS] **make it more difficult to do your work/schoolwork? How have** [HYPOMANIC SXS] **affected the quality of your work/schoolwork?)**

How has this affected your ability to take care of things at home?

IF UNKNOWN: **Have you needed to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

E. The episode is not severe enough to cause marked impairment in social or occupational functioning, or to necessitate hospitalization, and there are no psychotic features.

NOTE: Code "1" if markedly impairing symptoms, if hospitalization is necessary, or if there are psychotic symptoms.

? 1 2 3 A87

→ SXS NOT SEVERE ENOUGH FOR A DX OF MANIC EPISODE

→ CONTINUE ON NEXT PAGE

IF SEVERE ENOUGH TO REQUIRE HOSPITALIZATION OR SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT AND DURATION WAS AT LEAST 1 WEEK, CHECK HERE ___ AND GO TO A.10 AND TRANSCRIBE B CRITERION SYMPTOM RATINGS AND CONTINUE WITH RATINGS FOR CURRENT MANIC EPISODE. A88

IF SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT BUT LASTED LESS THAN 1 WEEK, CHECK HERE ____ AND GO TO ***PAST MANIC EPISODE*** A.18. IF CRITERIA ARE NOT MET FOR A PAST MANIC EPISODE, CODE "OTHER BIPOLAR DISORDER" FOR THIS SEVERE BUT BRIEF EPISODE, AND INDICATE TYPE 5 ON D.8. A89

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

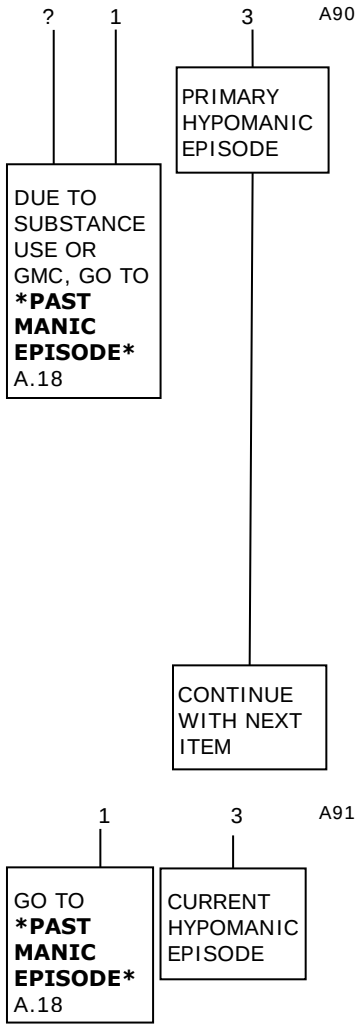
F. [Primary Hypomanic Episode:] The episode is not attributable to the physiological effects of a substance/medication or to another medical condition.

IF THERE IS ANY INDICATION THAT THE HYPOMANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: A full Hypomanic Episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a Hypomanic Episode diagnosis. However, caution is indicated so that one or two symptoms (particularly increased irritability, edginess, or agitation following antidepressant use) are neither taken as sufficient for diagnosis of a hypomanic episode, nor necessarily indicative of a bipolar diathesis.

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

HYPOMANIC EPISODE CRITERIA A, B, C, D, E, AND F ARE CODED "3."



PAST MANIC EPISODE

NOTE: IF CURRENTLY ELEVATED OR IRRITABLE MOOD BUT FULL CRITERIA ARE NOT MET FOR A MANIC EPISODE, SUBSTITUTE THE PHRASE **"Has there ever been ***another*** time ..."** *IN EACH OF THE SCREENING QUESTIONS BELOW*.

Have you ***ever* had a period of time when you were feeling so good, "high," excited, or "on top of the world" that other people thought you were not your normal self?**

IF YES: **What was it like? (Was that more than just feeling good?) Did you also feel like you were "hyper" or "wired" and had an unusual amount of energy? Were you much more active than is typical for you? (Did other people comment on how much you were doing?)**

IF NO: **Have you ***ever*** had a period of time when you were feeling irritable, angry, or short-tempered for most of the day, every day, for at least several days? What was that like? (Was that different from the way you usually are?)**

IF YES: **Did you also feel like you were "hyper" or "wired" and had an unusual amount of energy? Were you much more active than is typical for you? (Did other people comment on how much you were doing?)**

When was that?

How long did that last? (As long as 1 week?)

IF LESS THAN 1 WEEK: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?)**

Did you feel (**high/irritable**/OWN WORDS) **for most of the day, nearly every day during this time?**

Have you had more than one time like that? (Which time was the most extreme?)

IF UNCLEAR: **Have you had any times like that in the past year, since** (1 YEAR AGO)**?**

MANIC EPISODE CRITERIA

A. A distinct period [lasting at least several days] of abnormally and persistently elevated, expansive or irritable mood and abnormally and persistently increased [...] activity or energy.

Check if:

___ elevated, expansive mood
___ irritable mood

? 1 2 3 A92

GO TO *__CURRENT CYCLOTHYMIC DISORDER*__ A.28

A93
A94

...lasting at least 1 week and present most of the day, nearly every day (or any duration if hospitalization is necessary).

? 1 2 3 A95

GO TO __*PAST HYPOMANIC EPISODE*__ A.23

NOTE: If elevated mood lasts less than 1 week, check whether irritable mood lasts at least 1 week before skipping to A.23.

NOTE: If there is evidence for more than one past episode, select the worst episode that occurred in the prior year; if none of the past episodes occurred in the prior year, select the worst episode that occurred regardless of the time it occurred.

FOCUS ON THE WORST PERIOD OF THE EPISODE THAT YOU ARE INQUIRING ABOUT.

IF UNCLEAR: **During** (EPISODE), **when were you the most** (**high/irritable**/OWN WORDS)**?**

B. During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms have persisted (four if the mood is only irritable) and have been present to a significant degree and represent a noticeable change from usual behavior:

During that time...

...how did you feel about yourself? (More self-confident than usual? Did you feel much smarter or better than everyone else? Did you feel like you had any special powers or abilities?)	1. Inflated self-esteem or grandiosity.	?	1	2	3	A96
...did you need less sleep than usual? (How much sleep did you get?) *IF YES*: **Did you still feel rested?**	2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep).	?	1	2	3	A97
...were you much more talkative than usual? (Did people have trouble stopping you or understanding you? Did people have trouble getting a word in edgewise?)	3. More talkative than usual or pressure to keep talking.	?	1	2	3	A98
...**did you have thoughts racing through your head? (What was that like?)**	4. Flight of ideas or subjective experience that thoughts are racing.	?	1	2	3	A99
...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)	5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli) as reported or observed.	?	1	2	3	A100
...how did you spend your time? (Work, friends, hobbies? Were you especially busy during that time?) **(Did you find yourself more enthusiastic at work or working harder at your job? Did you find yourself more engaged in school activities or studying harder?)** **(Were you more sociable during that time, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)** **(Were you spending more time thinking about sex or involved in doing something sexual, by yourself or with others? Was that a big change for you?)** **Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still?** **(How bad was it?)**	6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation (i.e., purposeless non-goal-directed activity).	?	1	2	3	A101
	Check if:					
	___ increase in activity					A102
	___ psychomotor agitation					A103

During that time...

...did you do anything that could have caused trouble for you or your family?

(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)

(Anything sexual that was likely to get you in trouble? Driving recklessly?)

(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)

7. Excessive involvement in activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments)	?	1	2	3	A104

AT LEAST THREE "B" SXS ARE CODED "3" (FOUR IF MOOD ONLY IRRITABLE). [1] 3 A105

IF NOT ALREADY ASKED: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and had even more of the symptoms that I just asked you about?**

→ *IF YES*: *RETURN TO* ****PAST MANIC EPISODE**** *A.18, AND INQUIRE ABOUT WORST EPISODE.*

→ *IF NO*: *GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

CONTINUE ON NEXT PAGE

IF UNKNOWN: **What effect did these** (MANIC SXS) **have on your life?**

IF UNKNOWN: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION C.

How did (MANIC SXS) **affect your relationships or your interactions with other people? (Did** (MANIC SXS) **cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (MANIC SXS) **affect your work/school? (How about your attendance at work or school? Did** [MANIC SXS] **make it more difficult to do your work/schoolwork? How did** [MANIC SXS] **affect the quality of your work/schoolwork?)**

How did (MANIC SXS) **affect your ability to take care of things at home?**

C. The mood disturbance is sufficiently severe to cause marked impairment in social or occupational functioning or to necessitate hospitalization to prevent harm to self or others or there are psychotic features.

? 1 2 3 A106

CONTINUE ON NEXT PAGE

IF NOT ALREADY ASKED: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and had** (ACKNOWLEDGED MANIC SYMPTOMS) **and you got into trouble with people or were hospitalized?**

→ *IF YES: RETURN TO* ****PAST MANIC EPISODE**** *A.18, AND INQUIRE ABOUT OTHER EPISODE.*

→ *IF NO: GO TO* ****PAST HYPOMANIC CRITERION C**** *A.25*

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

D. [Primary Manic Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition.

? 1 3 A107

DUE TO SUBSTANCE USE OR GMC

PRIMARY MANIC EPISODE

IF THERE IS ANY INDICATION THAT THE MANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: A full Manic Episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a Manic Episode and, therefore a Bipolar I diagnosis.

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

IF UNKNOWN: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and were not** (**using** SUBSTANCE/**ill with AMC**)**?**

→ *IF YES: RETURN TO* ***PAST MANIC EPISODE*** *A.18, AND INQUIRE ABOUT OTHER EPISODE.*

→ *IF NO: GO TO* ***CURRENT CYCLOTHYMIC DISORDER*** *A.28.*

CONTINUE WITH NEXT ITEM

MANIC EPISODE CRITERIA A, B, C, AND D ARE CODED "3."

1 3 A108

PAST MANIC EPISODE

GO TO ***CURRENT CYCLOTHYMIC DISORDER***A.28

How old were you when (PAST MANIC EPISODE) **started?**

Age-at-onset of Past Manic Episode coded above

____ ____ A109

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

PAST HYPOMANIC EPISODE

HYPOMANIC EPISODE CRITERIA

When you were (**high/irritable**/OWN WORDS)**, did it last for at least 4 days? (Did it last for most of the day, nearly every day?)**

What was it like?

A. A distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased activity or energy, lasting at least 4 consecutive days and persistent most of the day, nearly every day.

? 1 2 3 A110

GO TO ***CURRENT CYCLOTHYMIC DISORDER*** A.28

Check if:

___ elevated, expansive mood A111
___ irritable mood A112

Have you had more than one time like that? (Which time was the most extreme?)

IF UNCLEAR: **Have you had any times like that in the past year, since** (1 YEAR AGO)**?**

NOTE: If there is evidence for more than one past episode, select the "worst" one for your inquiry about past Hypomanic Episode. If there was an episode in the past year, ask about that episode even if it was not the worst.

FOCUS ON THE WORST PERIOD OF THE EPISODE THAT YOU ARE INQUIRING ABOUT.

IF UNCLEAR: **During** (EPISODE)**, when were you the most** (**high/irritable**/OWN WORDS FOR HYPOMANIA)**?**

B. During the period of mood disturbance and increased energy and activity, 3 (or more) of the following symptoms (4 if the mood is only irritable) have persisted, represent a noticeable change from usual behavior, and have been present to a significant degree and represent a noticeable change from usual behavior:

During that time...

...how did you feel about yourself?

(More self-confident than usual? Did you feel much smarter or better than everyone else? Did you feel like you had any special powers or abilities?)

1. Inflated self-esteem or grandiosity. ? 1 2 3 A113

...did you need less sleep than usual? (How much sleep did you get?)

IF YES: **Did you still feel rested?**

2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep). ? 1 2 3 A114

...were you much more talkative than usual? (Did people have trouble stopping you or understanding you? Did people have trouble getting a word in edgewise?)

3. More talkative than usual or pressure to keep talking. ? 1 2 3 A115

...did you have thoughts racing through your head? (What was that like?)

4. Flight of ideas or subjective experience that thoughts are racing. ? 1 2 3 A116

...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)

5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli), as reported or observed. ? 1 2 3 A117

During that time...

...how did you spend your time? (Work, friends, hobbies? Were you especially productive or busy during that time?)

(Did you find yourself more enthusiastic at work or working harder at your job? Did you find yourself more engaged in school activities or studying harder?)

(Were you more sociable during that time, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)

(Were you spending more time thinking about sex or involved in doing something sexual, by yourself or with others? Was that a big change for you?)

Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still? (How bad was it?)

6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation. ? 1 2 3 A118

Check if:

____ increase in activity A119
____ psychomotor agitation A120

...did you do anything that could have caused trouble for you or your family?

(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)

(Anything sexual that was likely to get you in trouble? Driving recklessly?)

(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)

7. Excessive involvement in activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments) ? 1 2 3 A121

AT LEAST 3 "B" SXS ARE CODED "3" (4 IF MOOD ONLY IRRITABLE). 1 3 A122

NOTE: Because of the inherent difficulty in distinguishing normal periods of good mood from hypomania, review all items coded "3" in criterion B and recode any equivocal judgments.

CONTINUE WITH NEXT ITEM

*IF NO*T ALREADY ASKED: **Has there been any other time when you were** (**high/ irritable/**OWN WORDS) **and had even more of the symptoms that I just asked you about?**

- *IF YES: RETURN TO* ****PAST HYPOMANIC EPISODE**** *A.23 AND INQUIRE ABOUT THAT EPISODE.*
- *IF NO: GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

PAST HYPOMANIC CRITERION C

IF NOT KNOWN: **Was that very different from the way you usually are? (How were you different? At work? With friends?)**

C. The episode is associated with an unequivocal change in functioning that is uncharacteristic of the individual when not symptomatic. ? 1 2 3 A123

DESCRIBE:

CONTINUE ON NEXT PAGE

IF NOT ALREADY ASKED: **Have there been any other times when you were** (**high/ irritable**/OWN WORDS) **in which you were really different from the way you usually are?**

- *IF YES: RETURN TO* ****PAST HYPOMANIC EPISODE**** *A.23 AND INQUIRE ABOUT THAT EPISODE.*
- *IF NO: GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

IF NOT KNOWN: **Did other people notice the change in you? (What did they say?)**

D. The disturbance in mood and the change in functioning are observable by others. ? [1] 2 3 A124

DESCRIBE:

CONTINUE WITH NEXT ITEM

IF NOT ALREADY ASKED: **Have there been any other times when you were** (**high/irritable**/OWN WORDS) **and other people did notice the change in the way you were acting?**

→ *IF YES: RETURN TO* ****PAST HYPOMANIC EPISODE**** *A.23 AND INQUIRE ABOUT THAT EPISODE.*

→ *IF NO: GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

IF UNKNOWN: **What effect did these** (HYPOMANIC SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION:

How did (HYPOMANIC SXS) **affect your relationships or your interactions with other people? (Did they cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (HYPOMANIC SXS) **affect your work/school? (How about your attendance at work or school? Did** [HYPOMANIC SXS] **affect the quality of your work/schoolwork?)**

How did (HYPOMANIC SXS) **affect your ability to take care of things at home?**

IF UNKNOWN: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

E. The episode was not severe enough to cause marked impairment in social or occupational functioning or to necessitate hospitalization, and there are no psychotic features. ? 1 [2] 3 A125

SXS NOT SEVERE ENOUGH FOR A DX OF MANIC EPISODE

CONTINUE ON NEXT PAGE

IF SEVERE ENOUGH TO REQUIRE HOSPITALIZATION OR SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT AND DURATION WAS AT LEAST 1 WEEK, CHECK HERE ___ AND GO TO A.19 AND TRANSCRIBE B CRITERION SYMPTOM RATINGS AND CONTINUE WITH RATINGS FOR PAST MANIC EPISODE. A126

IF SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT BUT LASTED LESS THAN 1 WEEK, CHECK HERE ___ AND GO TO ***CURRENT CYCLOTHYMIC DISORDER*** A.28. IF CRITERIA ARE NOT MET FOR A PAST MANIC EPISODE, CODE "OTHER BIPOLAR DISORDER" FOR THIS SEVERE BUT BRIEF EPISODE, AND INDICATE "TYPE 5" ON D.8. A127

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

F. [Primary Hypomanic Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition.

IF THERE IS ANY INDICATION THAT THE HYPOMANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE*** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: A full hypomanic episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a hypomanic episode diagnosis. However, caution is indicated so that one or two symptoms (particularly increased irritability, edginess, or agitation following antidepressant use) are neither taken as sufficient for diagnosis of a hypomanic episode, nor necessarily indicative of a bipolar diathesis.

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

? 1 3 A128

DUE TO SUBSTANCE USE OR GMC

PRIMARY HYPOMANIC EPISODE

CONTINUE WITH NEXT ITEM

IF UNKNOWN: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and were not** (**using** SUBSTANCE/ MEDICATION/ill with AMC)**?**

- *IF YES: RETURN TO* ***PAST HYPOMANIC EPISODE*** *A.23 AND INQUIRE ABOUT ANOTHER EPISODE.*
- *IF NO: GO TO* ***CURRENT CYCLOTHYMIC DISORDER*** *A.28.*

HYPOMANIC EPISODE CRITERIA A, B, C, D, E, AND F ARE CODED "3."

1 3 A129

GO TO ***CURRENT CYCLOTHYMIC DISORDER*** A.28

PAST HYPOMANIC EPISODE

How old were you when (PAST HYPOMANIC EPISODE) **started?**

Age at onset of Past Hypomanic Episode coded above. ____ ____ A130

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

CURRENT CYCLOTHYMIC DISORDER

CURRENT CYCLOTHYMIC DISORDER CRITERIA

*IF THERE HAS EVER BEEN A MAJOR DEPRESSIVE, MANIC, OR HYPOMANIC EPISODE, CHECK HERE ___ AND GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER**** *A.30.* A131

For the past couple of years, since (2 YEARS AGO)**, have you had lots of times in which you were feeling high, excited or irritable as well as lots of time in which you were feeling down or depressed?**

IF YES: **Tell me about that.**

A. For at least 2 years (1 year for children or adolescents), there have been numerous periods with hypomanic symptoms that do not meet criteria for hypomanic episodes and numerous periods of depressed mood or loss of interest that did not meet criteria for a Major Depressive Episode. A132

? 1 2 3

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

Were you like this for most of the time since (2 YEARS AGO)**?**

IF YES: **Since** (2 YEARS AGO)**, what is the longest period of time in which you felt OK, that is, neither high, irritable, down, nor depressed?**

B. During the above 2-year period (1 year in children or adolescents), the hypomanic and depressive periods have been present for at least half the time and the individual has not been without the symptoms for more than 2 months at a time. A133

? 1 2 3

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

C. Criteria for a Major Depressive Episode, Manic, or Hypomanic Episode have never been met. A134

? 1 2 3

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

IF NOT ALREADY CLEAR: RETURN TO THIS ITEM AFTER COMPLETING THE PSYCHOTIC DISORDERS SECTION.

D. The symptoms in Criterion A are not better explained by Schizoaffective Disorder, Schizophrenia, Schizophreniform Disorder, Delusional Disorder, or Other Specified or Unspecified Schizophrenia Spectrum and Other Psychotic Disorder. A135

? 1 2 3

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

IF UNKNOWN: **When did this begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

E. [Primary Cyclothymia.] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition. A136

? 1 3

→ DUE TO SUBSTANCE USE OR AMC; GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

→ PRIMARY CYCLOTHYMIA

IF THERE IS ANY INDICATION THAT THE HYPOMANIC AND DEPRESSIVE SXS MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE/MEDICATION*** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

→ CONTINUE ON NEXT PAGE

IF UNKNOWN: **What effect have the mood swings had on your life? (For example, when you are feeling good, do you take things on but then not follow through when you get depressed?)**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION F:

How have mood swings affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)

How have the mood swings affected your work/school? (How about your attendance at work or school? Did they make it more difficult to do your work/schoolwork? How have the mood swings affected the quality of your work/schoolwork?)

How have the mood swings affected your ability to take care of things at home?

Have the mood swings affected any other important part of your life?

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by having mood swings ?**

F. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A137

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

CYCLOTHYMIC DISORDER CRITERIA A, B, C, D, E, AND F ARE CODED "3."

1 3 A138

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

→ CURRENT CYCLOTHYMIC DISORDER

CURRENT PERSISTENT DEPRESSIVE DISORDER

CURRENT PERSISTENT DEPRESSIVE DISORDER CRITERIA

*IF THERE HAS EVER BEEN A MANIC OR HYPOMANIC EPISODE, CHECK HERE ___ AND GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36.* A139

Since (2 YEARS AGO)**, have you been bothered by depressed mood most of the day, more days than not? (More than half of the time?)**

IF YES: **What has that been like?**

A. Depressed mood for most of the day, for more days than not, as indicated either by subjective account or observation by others, for at least 2 years. NOTE: in adolescents, mood can be irritable and duration must be at least 1 year. ? 1 2 3 A140

→ GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

During these periods of (OWN WORDS FOR CHRONIC DEPRESSION) **did you often...**

B. Presence, while depressed, of two (or more) of the following:

...lose your appetite? (What about overeating?)

1. Poor appetite or overeating. ? 1 2 3 A141

...have trouble sleeping or sleep too much?

2. Insomnia or hypersomnia. ? 1 2 3 A142

...have little energy to do things or feel tired a lot?

3. Low energy or fatigue. ? 1 2 3 A143

...feel down on yourself? (Feel worthless, or a failure?)

4. Low self-esteem. ? 1 2 3 A144

...have trouble concentrating or making decisions?

5. Poor concentration or difficulty making decisions. ? 1 2 3 A145

...feel hopeless?

6. Feelings of hopelessness. ? 1 2 3 A146

AT LEAST TWO "B" SYMPTOMS ARE CODED "3." ? 1 2 3 A147

→ GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

Since (2 YEARS AGO), **what was the longest period of time that you felt OK** (NO DYSTHYMIC SYMPTOMS)**?**

C. During the 2-year period (1 year for children or adolescents) of the disturbance, the individual has never been without the symptoms in Criteria A and B for more than 2 months at a time. 1 3 A148

NOTE: Code "1" if normal mood for more than 2 months at a time.

→ GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

E. There has never been a Manic Episode or a Hypomanic Episode, and criteria have never been met for Cyclothymic disorder. 1 3 A149

→ GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

IF NOT ALREADY CLEAR, RETURN TO THIS ITEM AFTER COMPLETING THE PSYCHOTIC DISORDERS SECTION.

F. The disturbance is not better explained by a persistent Schizoaffective Disorder, Schizophrenia, Delusional Disorder, or Other Specified or Unspecified Schizophrenia Spectrum or Other Psychotic Disorder.

1 3 A150

GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

NOTE: Code "3" if *NO* chronic psychotic disorder has been present or if *NOT* better explained by a chronic psychotic disorder.

IF UNKNOWN: **When did this begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

G. [Primary Persistent Depressive Disorder:] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition (e.g., hypothyroidism).

? 1 3 A151

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE/MEDICATION*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

DUE TO SUBSTANCE USE OR GMC, GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

PRIMARY DEPRESSIVE DISORDER

CONTINUE WITH NEXT ITEM

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.

IF UNKNOWN: **What effect have these** (DEPRESSIVE SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION H:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Has it caused you any problems in your relationships with your family, romantic partner or friends?)**

How have these (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Have** [DEPRESSIVE SXS] **made it more difficult to do your work/schoolwork? How did** [DEPRESSIVE SXS] **affect the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

H. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A152

Have these (DEPRESSIVE SXS) **affected any other important part of your life?**

IF DOES NOT INTERFERE WITH LIFE: How much you been bothered or upset by having (DEPRESSIVE SXS)**?**

PERSISTENT DEPRESSIVE DISORDER CRITERIA A, B, C, D, E, F, G, AND H ARE CODED "3."

1 → GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

3 → CURRENT PERSISTENT DEPRESSIVE DISORDER A153

*Indicate **onset** specifier*:
1 – **Early onset**: onset before age 21
2 – **Late onset**: onset age 21 or older A154

Specify if (for most recent 2 years of Persistent Depressive Disorder): A155

NOTE: Additional information about onset and offset of Major Depressive Episodes during the past 2 years may be needed to evaluate this specifier.

___ **With pure dysthymic syndrome**: Full criteria for a Major Depressive Episode have not been met in at least the preceding 2 years.

___ **With persistent Major Depressive Episode**: Full criteria for a Major Depressive Episode have been met throughout the preceding 2-year period.

___ **With intermittent Major Depressive Episodes, with current episode:** Full criteria for a Major Depressive Episode are currently met, but there have been periods of at least 8 weeks in at least the preceding 2 years with symptoms below the threshold for a full Major Depressive Episode.

___ **With intermittent Major Depressive Episodes, without current episode:** Full criteria for a Major Depressive Episode are not currently met, but there has been one or more Major Depressive Episodes in at least the preceding 2 years.

Specify if: A156

IF UNKNOWN: **Have there been any panic attacks in the past month?**

___ **With panic attacks**: if one or more panic attacks in the past month occurred in the context of current Persistent Depressive Disorder (see page F.7) and criteria have never been met for Panic Disorder.

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

PAST PERSISTENT DEPRESSIVE DISORDER

PAST PERSISTENT DEPRESSIVE DISORDER CRITERIA

IF NO CURRENT TWO YEAR PERIOD OF DEPRESSED MOOD: **Have you ever had a period of time, lasting for at least 2 years, when you have been bothered by depressed mood most of the day, more days than not? (More than half of the time?)**

IF YES: **What was that like?**

IF CURRENT TWO YEAR PERIOD OF DEPRESSED MOOD: **Prior to the past two years, have you ever had a period of time, lasting for at least 2 years, when you have been bothered by depressed mood most of the day, more days than not? (More than half of the time?)**

IF YES: **What was that like?**

A. Depressed mood for most of the day, for more days than not, as indicated either by subjective account or observation by others, for at least 2 years. NOTE: in adolescents, mood can be irritable and duration must be at least 1 year.

? 1 2 3 A157

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

During these periods of (OWN WORDS FOR CHRONIC DEPRESSION) **did you often...**

B. Presence, while depressed, of two (or more) of the following:

...lose your appetite? (What about overeating?)

1. Poor appetite or overeating. ? 1 2 3 A158

...have trouble sleeping or slept too much?

2. Insomnia or hypersomnia. ? 1 2 3 A159

...have little energy to do things or feel tired a lot?

3. Low energy or fatigue. ? 1 2 3 A160

...feel down on yourself? (Feel worthless, or a failure?)

4. Low self-esteem. ? 1 2 3 A161

...have trouble concentrating or making decisions?

5. Poor concentration or difficulty making decisions. ? 1 2 3 A162

...feel hopeless?

6. Feelings of hopelessness. ? 1 2 3 A163

AT LEAST TWO "B" SYMPTOMS ARE CODED "3." ? 1 2 3 A164

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

What was the longest period of time during this period of long-lasting depression, that you felt OK (NO DYSTHYMIC SYMPTOMS)?

C. During the 2-year period (1 year for children or adolescents) of the disturbance, the individual has never been without the symptoms in Criteria A and B for more than 2 months at a time.

NOTE: Code "1" if normal mood for more than 2 months at a time.

1 3 A165

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

E. There has never been a Manic Episode or a Hypomanic Episode, and criteria have never been met for Cyclothymic disorder.

1 3 A166

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

IF NOT ALREADY CLEAR: RETURN TO THIS ITEM AFTER COMPLETING THE PSYCHOTIC DISORDERS SECTION.

F. The disturbance is not better explained by a Persistent Schizoaffective Disorder, Schizophrenia, Delusional Disorder, or Other Specified or Unspecified Schizophrenia Spectrum or Other Psychotic Disorder.

NOTE: Code "3" if NO chronic psychotic disorder has been present or if NOT better explained by a chronic psychotic disorder.

1 3 A167

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

IF UNKNOWN: **When did this begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

G. [Primary Persistent Depressive Disorder:] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition (e.g., hypothyroidism).

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE/MEDICATION*** A.45 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.

? 1 3 A168

→ PRIMARY DEPRESSIVE DISORDER

→ DUE TO SUBSTANCE USE OR GMC; GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

→ CONTINUE ON NEXT PAGE

IF UNKNOWN: **What effect did these** (DEPRESSIVE SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION H:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Have** (DEPRESSIVE SXS) **caused you any problems in your relationships with your family, romantic partner or friends?)**

How have these (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Did** [DEPRESSIVE SXS] **make it more difficult to do your work/schoolwork? How did** [DEPRESSIVE SXS] **affect the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have these (DEPRESSIVE SXS) **affected any other important part of your life?**

IF DID NOT INTERFERE WITH LIFE: **How much have you been bothered or upset by having** (DEPRESSIVE SXS)**?**

H. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A169

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

PERSISTENT DEPRESSIVE DISORDER CRITERIA A, B, C, D, E, F, G, AND H ARE CODED "3."

1 3 A170

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

→ PAST PERSISTENT DEPRESSIVE DISORDER

*Indicate **onset** specifier*: (circle the appropriate number)
1 – **Early onset**: onset before age 21
2 – **Late onset**: onset age 21 or A171

PREMENSTRUAL DYSPHORIC DISORDER (PAST 12 MONTHS)

PREMENSTRUAL DYSPHORIC DISORDER CRITERIA

IF SUBJECT IS A BIOLOGICAL MALE, POST-MENOPAUSAL FEMALE, PREGNANT FEMALE, OR FEMALE WITH HYSTERECTOMY PLUS OOPHORECTOMY, CHECK HERE ___ AND SKIP TO NEXT MODULE. A172

Looking back over your menstrual cycles for the past 12 months, since (1 YEAR AGO)**, have you had mood symptoms such as anger, irritability, anxiety, or depression that developed before your period and then went away during the week after your period?**

IF YES: **After your period began, did the problems disappear for at least a week?**

For how many days during a cycle did you have symptoms?

Since (1 YEAR AGO)**, did this happen for most of your cycles?**

A. In the majority of menstrual cycles, at least five symptoms must be present in the final week before the onset of menses, start to improve within a few days after the onset of menses, and become minimal or absent in the week postmenses.

? 1 2 3 A173

GO TO NEXT MODULE

NOTE: If number of days of symptoms is 20 per month or greater, recheck symptom-free and symptom present intervals.

Think of the most severe premenstrual time you experienced since (1 YEAR AGO)**. Tell me about that time.**

Now I'm going to ask you some specific questions about that premenstrual time.

B. One (or more) of the following symptoms must be present:

...did you have mood swings in which you would feel suddenly sad or tearful?

IF NO: **How about getting unusually upset if someone criticized or rejected you?**

IF YES TO EITHER: **Did this go away when your menstrual period began or shortly after?**

1. Marked affective liability (e.g., mood swings; feeling suddenly sad or tearful, or increased sensitivity to rejection).

? 1 2 3 A174

...were you especially irritable or angry?

IF NO: **How about getting into a lot of fights or arguments with other people?**

IF YES TO EITHER: **Did this go away when your menstrual period began or shortly after?**

2. Marked irritability or anger or increased interpersonal conflicts.

? 1 2 3 A175

...did you feel very sad, down, depressed, or hopeless? *IF NO*: **How about feeling especially critical of yourself or that everything you did was wrong?** *IF YES TO EITHER:* **Did this go away when your menstrual period began or shortly after?**	3. Marked depressed mood, feelings of hopelessness, or self-deprecating thoughts.	?	1	2	3	A176
...did you feel extremely anxious or tense or like you were keyed up or on edge? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	4. Marked anxiety, tension, and/or feelings of being keyed up or on edge.	?	1	2	3	A177
	AT LEAST ONE "B" SYMPTOM IS CODED "3"		1		3	A178
			GO TO NEXT MODULE			
Now I'm going to ask you about some other experiences that sometimes go along with these mood symptoms.	C. One (or more) of the following symptoms must additionally be present, to reach a total of five symptoms when combined with symptoms from Criterion B above.					
...did you lose interest in work or school, going out with friends, or in your hobbies? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	1. Decreased interest in usual activities (e.g., work, school, friends, and hobbies).	?	1	2	3	A179
...did you find it hard to concentrate on things? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	2. Subjective difficulty in concentration.	?	1	2	3	A180
...did you feel like your energy was very low or that you got tired very easily? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	3. Lethargy, easy fatigability, or marked lack of energy.	?	1	2	3	A181
...was your appetite increased? Did you have specific food cravings, like for chocolate or fried foods? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	4. Marked change in appetite; overeating; or specific food cravings.	?	1	2	3	A182

...were you sleeping more than is usual for you or have difficulty sleeping? (How much sleep were you getting during that time?) *IF YES*: **Did this go away when your menstrual period began or shortly after?**	5. Hypersomnia or insomnia.	?	1	2	3	A183
...were you feeling overwhelmed by everything or like your life was out of control? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	6. A sense of being overwhelmed or out of control.	?	1	2	3	A184
...did you have physical symptoms like breast tenderness or swelling, joint or muscle pain, or feeling bloated? Did you gain weight? *IF YES*: **Did these symptoms go away when your menstrual period began or shortly after?**	7. Physical symptoms such as breast tenderness or swelling, joint or muscle pain, a sensation of "bloating," or weight gain.	?	1	2	3	A185
	AT LEAN ONE "C" SYMPTOM IS CODED "3."		1		3	A186
			GO TO NEXT MODULE			
	AT LEAST FIVE "B" AND "C" SYMPTOMS ARE CODED "3."		1		3	A187
			GO TO NEXT MODULE			
IF UNCLEAR: **Has this happened for most of your cycles in the past year?**	Symptoms in criterion A-C must have been met for most menstrual cycles in the preceding year. NOTE: Code "3" only if symptoms in criteria A-C have been met for 7 or more cycles in the past year.	?	1	2	3	A188
			GO TO NEXT MODULE			

***IF UNKNOWN*: What effect have** (PMDD SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION D:

How have (PMDD SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (PMDD SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have (PMDD SXS) **affected your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have (PMDD SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE:
How much have you been bothered or upset by having (PMDD SXS)**?**

D. The symptoms are associated with clinically significant distress or interference with work, school, usual social activities, or relationships with others (e.g., avoidance of social activities; decreased productivity and efficiency at work, school, or home).

? 1 2 3 A188

GO TO NEXT MODULE

IF HISTORY OF ANOTHER MENTAL DISORDER AND UNKNOWN: **Are these symptoms different from the symptoms you had from** (PAST DISORDER)**? Or is it just those same symptoms getting worse just before your period?**

E. The disturbance is not merely an exacerbation of the symptoms of another disorder, such as Major Depressive Disorder, Panic Disorder, Persistent Depressive Disorder (Dysthymia), or a personality disorder (although it may co-occur with any of these disorders).

? 1 2 3 A189

GO TO NEXT MODULE

Since (1 YEAR AGO)**, when you were having these symptoms, were you physically ill?**

IF YES: **What did the doctor say?**

Since (1 YEAR AGO), **have you been taking any medications?**

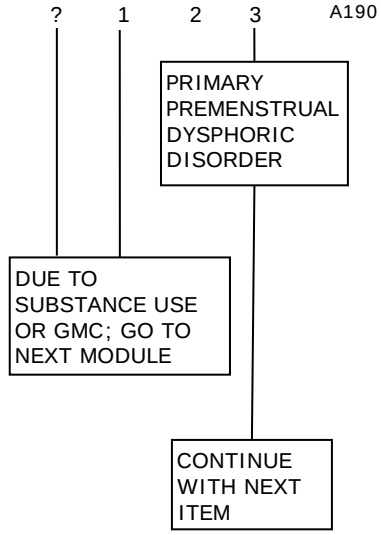
IF YES: **Any change in the amount you were taking?**

Since (1 YEAR AGO)**, have you been drinking or using any drugs?**

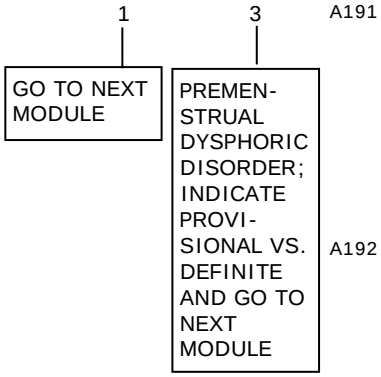
G. [Primary Premenstrual Dysphoric Disorder:] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication, other treatment) or another medical condition (e.g., hyperthyroidism).

IF THERE IS ANY INDICATION THAT THE SYMPTOMS MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.



PMDD CRITERIA A, B, C, D, E, AND G ARE CODED "3."



IF UNKNOWN: **Have you ever kept a diary of your symptoms and how they relate to your cycles?**

*Indicate **provisional** vs. **definite** diagnosis*: (circle the appropriate number)

1 - **Provisional dx:** The symptom pattern in Criterion A has NOT been confirmed by prospective daily ratings during at least two symptomatic cycles.

2 - **Definite dx:** Criterion F is present, i.e., the symptom pattern in Criterion A (i.e., at least five symptoms must be present in the final week before the onset of menses, start to improve within a few days after the onset of menses, and become minimal or absent in the week postmenses) has been confirmed by prospective daily ratings during at least two symptomatic cycles.

GMC/SUBSTANCE CAUSING BIPOLAR AND RELATED SYMPTOMS

BIPOLAR AND RELATED DISORDER DUE TO ANOTHER MEDICAL CONDITION

BIPOLAR AND RELATED DISORDER DUE TO ANOTHER MEDICAL CONDITION CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH A GENERAL MEDICAL CONDITION, CHECK HERE ___ AND GO TO ****SUBSTANCE-INDUCED BIPOLAR AND RELATED DISORDER**** *A.43.* A193

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent period of abnormally elevated, expansive, or irritable mood and abnormally increased activity or energy that predominates in the clinical picture. ? 1 2 3 A194

B/C. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of another medical condition and the disturbance is not better accounted for by another mental disorder. ? 1 3 A195

GO TO ***SUBSTANCE INDUCED*** A.43

Did the (BIPOLAR SXS) **change after** (GMC) **began? Did** (BIPOLAR SXS) **start or get much worse only after** (GMC) **began? How long after** (GMC) **began did** (BIPOLAR SXS) **start or get much worse?**

*IF GMC HAS RESOLVED***: Did the** (BIPOLAR SXS) **get better once the** (GMC) **got better?**

NOTE: The following factors should be considered and, if present, support the conclusion that a general medical condition is etiologic to the bipolar symptoms.

1) There is evidence from the literature of a well-established association between the general medical condition and the bipolar symptoms. (Refer to list of etiological medical conditions on page A.13.)

2) There is a close temporal relationship between the course of the bipolar symptoms and the course of the general medical condition.

3) The bipolar symptoms are characterized by unusual presenting features (e.g., late age-at-onset).

4) The absence of alternative explanations (e.g., bipolar symptoms as a psychological reaction to the stress of being diagnosed with a general medical condition).

IF UNKNOWN: **What effect have** (BIPOLAR SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (BIPOLAR SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have they affected your work/ school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)

How did (BIPOLAR SXS) **affect your ability to take care of things at home? Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

Have (BIPOLAR SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have** (BIPOLAR SXS) **bothered or upset you?**

E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or necessitates hospitalization to prevent harm to self or others, or there are psychotic features.

? 1 2 3 A196

GO TO ***SUBSTANCE INDUCED*** A.43

NOTE: The D criterion (delirium rule-out) has been omitted.

BIPOLAR DISORDER DUE TO AMC CRITERIA A, B/C, AND E ARE CODED "3."

1 3 A197

BIPOLAR DISORDER DUE TO AMC

Check here ___ if current in the past month. A198

Specify if: A199

1 - With manic features: Full criteria are not met for a manic or hypomanic episode.

2 - With manic- or hypomanic-like episode: Full criteria are met except Criterion D for a manic episode or except Criterion F for a hypomanic episode.

3 - With mixed features: Symptoms of depression are also present but do not predominate in the clinical picture.

CONTINUE ON NEXT PAGE

SUBSTANCE-/MEDICATION-INDUCED BIPOLAR DISORDER

SUBSTANCE-/MEDICATION-INDUCED BIPOLAR DISORDER CRITERIA

IF SYMPTOMS ARE <u>NOT</u> TEMPORALLY ASSOCIATED WITH SUBSTANCE/MEDICATION USE, CHECK HERE ___ AND RETURN TO EPISODE BEING EVALUATED, CONTINUING WITH THE ITEM FOLLOWING "SYMPTOMS ARE NOT ATTRIBUTABLE TO THE PHYSIOLOGICAL EFFECTS OF A SUBSTANCE OR ANOTHER MEDICAL CONDITION" (SEE PAGE NUMBERS IN BOX TO THE RIGHT).

PAGE TO RETURN TO IN EPISODE BEING EVALUATED:	
Current Manic	A.13
Current Hypomanic	A.17
Past Manic	A.22
Past Hypomanic	A.27
Current Cyclothymic Disorder	A.28
Other Specified Bipolar	D.7

A200

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent disturbance in mood that predominates in the clinical picture and is characterized by elevated, expansive, or irritable mood, with or without depressed mood, or markedly diminished interest or pleasure in all, or almost all activities.

? 1 2 3 A201

IF UNKNOWN: **When did the** (BIPOLAR SXS) **begin? Were you already using** (SUBSTANCE/MEDICATION) **or had you just stopped or cut down your use?**

IF UNKNOWN: **How much** (SUBSTANCE/MEDICATION) **were you using when you began to have** (BIPOLAR SXS)**?**

B. There is evidence from the history, physical examination, or laboratory findings of both (1) and (2):

1. The symptoms in criterion A developed during or soon after substance intoxication or withdrawal or exposure to a medication.

2. The involved substance/medication is capable of producing the symptoms in Criterion A. NOTE: Refer to list of etiological substances/medications on page A.13.

? 1 2 3 A202

NOT SUBSTANCE-INDUCED. RETURN TO EPISODE BEING EVALUATED

ASK ANY OF THE FOLLOWING QUESTIONS <u>AS NEEDED</u> TO RULE OUT A NON-SUBSTANCE-INDUCED ETIOLOGY.

IF UNKNOWN: **Which came first, the** (SUBSTANCE/MEDICATION USE) **or the** (BIPOLAR SXS)**?**

IF UNKNOWN: **Have you had a period of time when you stopped using** (SUBSTANCE/MEDICATION)**?**

IF YES: **After you stopped using** (SUBSTANCE/MEDICATION) **did the** (BIPOLAR SXS) **go away or get better?**

IF YES: **How long did it take for them to get better? Did they go away within a month of stopping?**

IF UNKNOWN: **Have you had any other episodes of** (BIPOLAR SXS)**?**

IF YES: **How many? Were you using** (SUBSTANCE/MEDICATION) **at those times?**

C. The disturbance is NOT better accounted for by a bipolar or related disorder that is not substance-induced. Such evidence of an independent bipolar or related disorder could include the following:

NOTE: The following three statements constitute evidence that the bipolar symptoms are not substance-induced. Code "1" if any are true. Code "3" only if *none* are true.

1) The symptoms precede the onset of the substance/medication use;
2) The symptoms persist for a substantial period of time (e.g., about 1 month) after the cessation of acute withdrawal or severe intoxication; or
3) There is other evidence suggesting the existence of an independent non-substance/medication-induced bipolar and related disorder (e.g., a history of recurrent non-substance/medication-related episodes).

? 1 3 A203

RETURN TO EPISODE BEING EVALUATED

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

IF UNKNOWN: **What effect have** (BIPOLAR SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (BIPOLAR SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner, or friends?)**

How have (BIPOLAR SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How did (BIPOLAR SXS) **affect your ability to take care of things at home? Have you needed to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

Have (BIPOLAR SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have** (BIPOLAR SX) **bothered or upset you?**

E. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A204

→ RETURN TO EPISODE BEING EVALUATED

NOTE: The D criterion (delirium rule-out) has been omitted.

SUBSTANCE-INDUCED BIPOLAR DISORDER CRITERIA A, B, C, AND E ARE CODED "3."

1 3 A205

→ SUBSTANCE-/MEDICATION-INDUCED BIPOLAR DISORDER

Check here ___ if current in the past month. A206

*Indicate **context of development** of mood symptoms*: A207

1 – **With onset during intoxication**

2 – **With onset during withdrawal**

→ RETURN TO EPISODE BEING EVALUATED

GMC/SUBSTANCE CAUSING DEPRESSIVE SYMPTOMS

DEPRESSIVE DISORDER DUE TO ANOTHER MEDICAL CONDITION

DEPRESSIVE DISORDER DUE TO ANOTHER MEDICAL CONDITION CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH A GENERAL MEDICAL CONDITION, CHECK HERE ___ AND GO TO ****SUBSTANCE-INDUCED DEPRESSIVE DISORDER**** *A.48* A208

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent period of depressed mood or markedly diminished interest or pleasure in all, or almost all, activities that predominates in the clinical picture. ? 1 2 3 A209

B./C. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of another medical condition and the disturbance is not better accounted for by another mental disorder. ? 1 3 A210

GO TO ***SUBSTANCE INDUCED*** A.48

Did the (DEPRESSIVE SXS) **change after** (GMC) **began? Did** (DEPRESSIVE SXS) **start or get much worse only after** (GMC) **began? How long after** (GMC) **began did** (DEPRESSIVE SXS) **start or get much worse?**

*IF GMC HAS RESOLVED***: Did the** (DEPRESSIVE SXS) **get better once the** (GMC) **got better?**

NOTE: The following factors should be considered and, if present, support the conclusion that a general medical condition is etiologic to the depressive symptoms.

1) There is evidence from the literature of a well-established association between the general medical condition and the depressive symptoms. (Refer to list of etiological general medical conditions on page A.4.)

2) There is a close temporal relationship between the course of the depressive symptoms and the course of the general medical condition.

3) The depressive symptoms are characterized by unusual presenting features (e.g., late age-at-onset).

4) The absence of alternative explanations (e.g., depressive symptoms as a psychological reaction to the stress of being diagnosed with a general medical condition).

IF UNKNOWN: **What effect have** (DEPRESSIVE SX) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner, or friends?)**

How have (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have (DEPRESSIVE SXS) **affected any other important part of your life?**

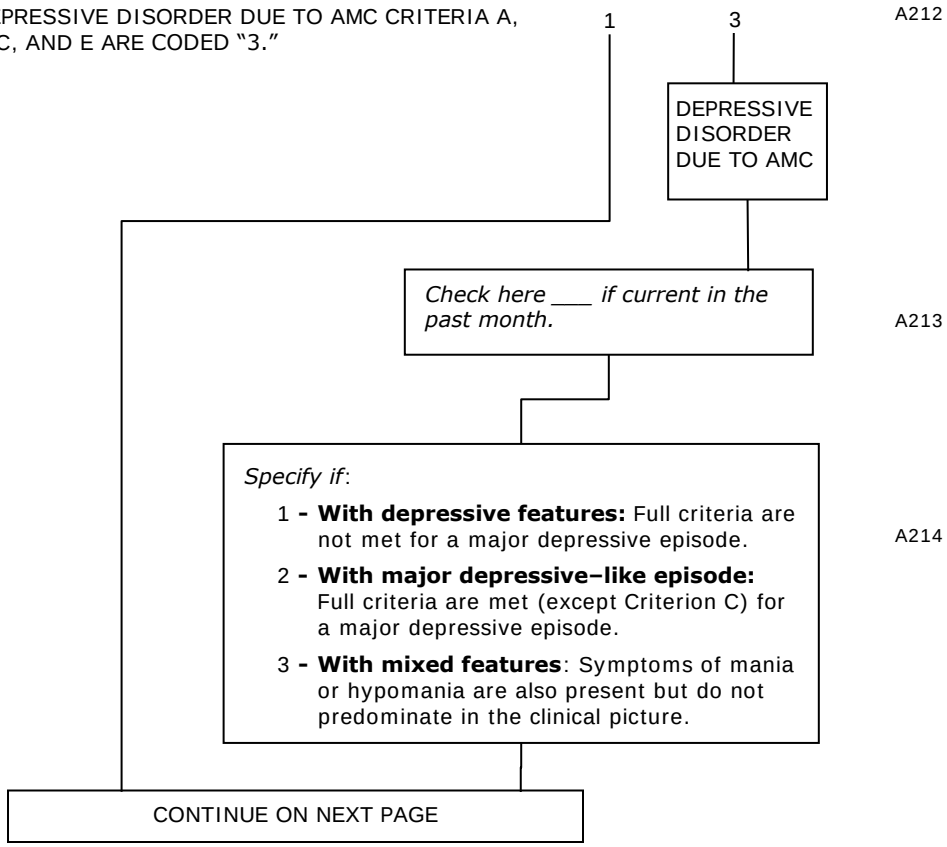
IF HAVE NOT INTERFERED WITH LIFE: **How much have** (DEPRESSIVE SXS) **bothered or upset you?**

E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A211

GO TO ***SUBSTANCE INDUCED*** A.48

NOTE: The D criterion (delirium rule-out) has been omitted.


DEPRESSIVE DISORDER DUE TO AMC CRITERIA A, B/C, AND E ARE CODED "3."
1
3
A212
DEPRESSIVE DISORDER DUE TO AMC
Check here ___ if current in the past month.
A213
Specify if:
1 - With depressive features: Full criteria are not met for a major depressive episode.
2 - With major depressive–like episode: Full criteria are met (except Criterion C) for a major depressive episode.
3 - With mixed features: Symptoms of mania or hypomania are also present but do not predominate in the clinical picture.
A214
CONTINUE ON NEXT PAGE

SUBSTANCE-/MEDICATION-INDUCED DEPRESSIVE DISORDER

SUBSTANCE-/MEDICATION-INDUCED DEPRESSIVE DISORDER CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH SUBSTANCE/MEDICATION USE, CHECK HERE ___ AND RETURN TO EPISODE BEING EVALUATED, CONTINUING WITH THE ITEM FOLLOWING "SYMPTOMS ARE NOT ATTRIBUTABLE TO THE PHYSIOLOGICAL EFFECTS OF A SUBSTANCE OR ANOTHER MEDICAL CONDITION" (SEE PAGE NUMBERS IN BOX TO THE RIGHT).

PAGE TO RETURN TO IN EPISODE BEING EVALUATED:	
Current MDE	A.4
Past MDE	A.9
Current Persistent Depressive Disorder	A.31
Past Persistent Depressive Disorder	A.34
PMDD	A.40
Other Specified Depressive Disorder	D.12

A215

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent disturbance in mood that predominates in the clinical picture and is characterized by depressed mood or markedly diminished interest or pleasure in all, or almost all, activities

? 1 2 3 A216

IF UNKNOWN: **When did the** (DEPRESSIVE SXS) **begin? Were you already using** (SUBSTANCE/MEDICATION) **or had you just stopped or cut down your use?**

IF UNKNOWN: **How much** (SUBSTANCE/MEDICATION) **were you using when you began to have** (DEPRESSIVE SXS)**?**

B. There is evidence from the history, physical examination, or laboratory findings of both (1) and (2):

1. The symptoms in criterion A developed during or soon after substance intoxication or withdrawal or exposure to a medication

2. The involved substance/medication is capable of producing the symptoms in Criterion A. NOTE: refer to list of etiological substances/medications on page A.4.

? 1 2 3 A217

1 → NOT SUBSTANCE-INDUCED.RETURN TO EPISODE BEING EVALUATED

ASK ANY OF THE FOLLOWING QUESTIONS AS NEEDED TO RULE OUT A NON-SUBSTANCE-INDUCED ETIOLOGY.

IF UNKNOWN: **Which came first, the** (SUBSTANCE/MEDICATION USE) **or the** (DEPRESSIVE SXS)**?**

IF UNKNOWN: **Have you had a period of time when you stopped using** (SUBSTANCE/MEDICATION)**?**

IF YES: **After you stopped using** (SUBSTANCE/MEDICATION) **did the** (DEPRESSIVE SXS) **go away or get better?**

IF YES: **How long did it take for them to get better? Did they go away within a month of stopping?**

IF UNKNOWN: **Have you had any other episodes of** (DEPRESSIVE SXS)?

IF YES: **How many? Were you using** (SUBSTANCE/MEDICATION) **at those times?**

C. The disturbance is NOT better accounted for by a depressive disorder that is not substance-induced. Such evidence of an independent depressive disorder could include the following:

? 1 3 A218

RETURN TO EPISODE BEING EVALUATED

NOTE: The following three statements constitute evidence that the depressive symptoms are not substance-induced. Code "1" if any are true. Code "3" only if *none* are true.

1) The symptoms precede the onset of the substance/medication use;
2) The symptoms persist for a substantial period of time (e.g., about 1 month) after the cessation of acute withdrawal or severe intoxication; or
3) There is other evidence suggesting the existence of an independent non-substance/ medication-induced depressive disorder (e.g., a history of recurrent non-substance/ medication-related episodes).

IF UNKNOWN: **What effect have** (DEPRESSIVE SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have (DEPRESSIVE SXS) **affected any other important part of your life?**

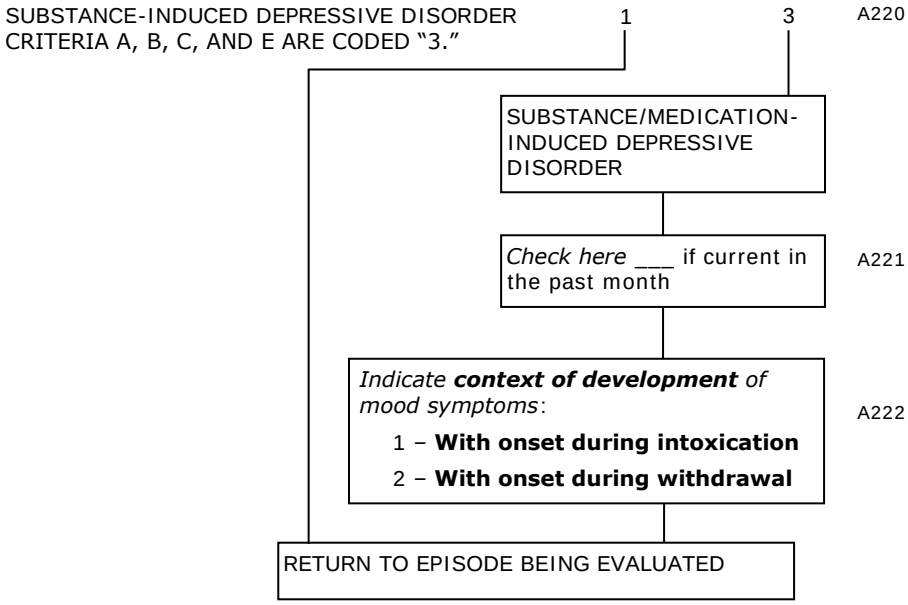
IF HAVE NOT INTERFERED WITH LIFE: **How much have** (DEPRESSIVE SXS) **bothered or upset you?**

E. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A219

RETURN TO EPISODE BEING EVALUATED

NOTE: the D criterion (delirium rule-out) has been omitted.


SUBSTANCE-INDUCED DEPRESSIVE DISORDER
CRITERIA A, B, C, AND E ARE CODED "3."
1
3
A220
SUBSTANCE/MEDICATION-INDUCED DEPRESSIVE DISORDER
Check here ___ if current in the past month
A221
Indicate context of development of mood symptoms:
1 – With onset during intoxication
2 – With onset during withdrawal
A222
RETURN TO EPISODE BEING EVALUATED

A. MOOD EPISODES

NOTE: This module is for evaluating Current and Past Mood Episodes, Cyclothymic Disorder, Persistent Depressive Disorder (Dysthymia), AND Premenstrual Dysphoric Disorder. Bipolar I Disorder, Bipolar II Disorder, Other Specified Bipolar Disorder, Major Depressive Disorder, and Other Specified Depressive Disorder are diagnosed in Module D.

CURRENT MAJOR DEPRESSIVE EPISODE

Now I am going to ask you some more questions about your mood.

Since (1 MONTH AGO)**, has there been a period of time when you were feeling depressed or down <u>most of the day nearly every day</u>? (Has anyone said that you look sad, down, or depressed?)**

IF NO: **What about feeling empty or hopeless most of the day nearly every day?**

IF YES TO EITHER OF ABOVE: **What has that been like? How long has it lasted? (As long as 2 weeks?)**

IF PREVIOUS ITEM CODED "3:" **During that time, did you lose interest or pleasure in things you usually enjoyed? (What has that been like? Give me some examples.)**

IF PREVIOUS ITEM NOT CODED "3:" **What about a time since** (1 MONTH AGO) **when you lost interest or pleasure in things you usually enjoyed? (What has that been like? Give me some examples.)**

IF YES: **Has it been nearly every day? How long has it lasted? (As long as 2 weeks?)**

FOR THE FOLLOWING QUESTIONS, FOCUS ON THE WORST 2 WEEKS IN THE PAST MONTH (OR ELSE THE PAST 2 WEEKS IF EQUALLY DEPRESSED FOR ENTIRE MONTH).

IF UNKNOWN: **Since** (1 MONTH AGO)**, during which 2-week period would you say you have been doing the worst?**

MAJOR DEPRESSIVE EPISODE CRITERIA

A. Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood, or (2) loss of interest or pleasure.

1. Depressed mood most of the day, nearly every day, as indicated either by subjective report (e.g., feels sad, empty, hopeless) or observation made by others (e.g., appears tearful). NOTE: in children or adolescents, can be irritable mood.

? 1 2 3 A1

2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated either by subjective account or observation).

? 1 2 3 A2

IF NEITHER ITEM A.1 NOR A.2 IS CODED "3," GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

NOTE: When rating the following items, code "1" if the symptoms are clearly due to a general medical condition (e.g., insomnia due to severe back pain).

During (2-WEEK PERIOD)**...**

...how has your appetite been? (What about compared to your usual appetite? Have you had to force yourself to eat? Eat [less/more] than usual? Has that been nearly every day? Have you lost or gained any weight? How much? *IF YES*: **Have you been trying to [lose/gain] weight?)**	3. Significant weight loss when not dieting, or weight gain (e.g., a change of more than 5% of body weight in a month) or decrease or increase in appetite nearly every day. NOTE: in children, consider failure to make expected weight gains. *Check if*: ____ weight loss or decreased appetite ____ weight gain or increased appetite	?	1	2	3	A3 A4 A5
...how have you been sleeping? (Trouble falling asleep, waking frequently, trouble staying asleep, waking too early, OR sleeping too much? How many hours of sleep [including naps] have you been getting? How many hours of sleep did you typically get before you got [**depressed**/OWN WORDS]**? <u>Has it been nearly every night?)</u>**	4. Insomnia or hypersomnia nearly every day. *Check if*: ____ insomnia ____ hypersomnia	?	1	2	3	A6 A7 A8
...have you been so fidgety or restless that you were unable to sit still? What about the opposite—talking more slowly, or moving more slowly than is normal for you, as if you're moving through molasses or mud? (In either instance, has it been so bad that other people have noticed it? What have they noticed? <u>Has that been nearly every day?)</u>	5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down) NOTE: Consider behavior during the interview. *Check if*: ____ psychomotor agitation ____ psychomotor retardation	?	1	2	3	A9 A10 A11
...what has your energy level been like? (Tired all the time? <u>Nearly every day?)</u>	6. Fatigue or loss of energy nearly every day.	?	1	2	3	A12
...have you been feeling worthless? **What about feeling guilty about things you have done or not done?** *IF YES*: **What things? (Is this only because you can't take care of things since you have been sick?)** *IF YES TO EITHER OF ABOVE:* **<u>Nearly every day?</u>**	7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick) *Check if*: ____ worthlessness ____ inappropriate guilt	?	1	2	3	A13 A14 A15
...have you had trouble thinking or concentrating? Has it been hard to make decisions about everyday things? (What kinds of things has it been interfering with? <u>Nearly every day?)</u>	8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).	?	1	2	3	A16

...have things been so bad that you thought a lot about death or that you would be better off dead? Have you thought about taking your own life?

IF YES: **Have you done something about it? (What have you done? Have you made a specific plan? Have you taken any action to prepare for it? Have you actually made a suicide attempt?)**

9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

? 1 2 3 A17

NOTE: Code "1" for self-mutilation without suicidal intent.

Check if:

___ thoughts of own death A18
___ suicidal ideation A19
___ specific plan A20
___ suicide attempt A21

NOTE: Any current suicidal thoughts, plans, or actions should be thoroughly assessed by the clinician and action taken if necessary.

AT LEAST FIVE OF THE ABOVE SXS (A.1–A.9) ARE CODED "3" AND AT LEAST ONE OF THESE IS ITEM A.1 OR A.2.

3 A22

1

GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

IF UNKNOWN: **What effect have** (DEPRESSIVE SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION B:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Has this caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Did** [DEPRESSIVE SXS] **make it more difficult to do your work/schoolwork? How have** [DEPRESSIVE SXS] **affected the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? What about doing other things that are important to you like religious activities, physical exercise, or hobbies? Have you avoided doing anything because you felt like you weren't up to it?**

Have (DEPRESSIVE SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by having** (DEPRESSIVE SXS)**?**

B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A23

1

GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

IF UNKNOWN: **When did** (EPISODE OF DEPRESSION) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

C. [Primary Depressive Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition.

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE/MEDICATION), GO TO ***GMC/SUBSTANCE*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

Etiological medical conditions include: stroke, Huntington's disease, Parkinson's disease, traumatic brain injury, Cushing's disease, hypothyroidism, multiple sclerosis, systemic lupus erythematosus.

Etiological substances/medications include: alcohol (I/W), phencyclidine (I), hallucinogens (I), inhalants (I), opioids (I/W), sedative, hypnotics or anxiolytics (I/W), amphetamine and other stimulants (I/W), cocaine (I/W), antiviral agents (etavirenz), cardiovascular agents (clonodine, guanethidine, methyldopa, reserpine), retinoic acid derivatives (isotretinoin), antidepressants, anticonvulsants, anti-migraine agents (triptans), antipsychotics, hormonal agents (corticosteroids, oral contraceptives, gonadotropin-releasing hormone agonists, tamoxifen), smoking cessation agents (varenicline) and immunological agents (interferon).

A24

? → DUE TO SUBSTANCE USE OR GMC, GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

1 → DUE TO SUBSTANCE USE OR GMC, GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

3 → PRIMARY DEPRESSIVE EPISODE → CONTINUE WITH NEXT ITEM

MAJOR DEPRESSIVE EPISODE CRITERIA A, B, AND C ARE CODED "3."

A25

1 → GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** A.5

3 → CURRENT MAJOR DEPRESSIVE EPISODE

How many separate times in your life have you been (**depressed**/OWN WORDS) **nearly every day for at least 2 weeks and had several of the symptoms that you described, like** (SXS OF CURRENT MDE)**?**

Total number of Major Depressive Episodes, including current (CODE 99 IF TOO NUMEROUS OR INDISTINCT TO COUNT).

A26 _____ _____

WITH ANXIOUS DISTRESS

ANXIOUS DISTRESS SPECIFIER CRITERIA

NOTE: THE TIMEFRAME FOR THIS SPECIFIER IS THE ENTIRE DURATION OF THE CURRENT DEPRESSIVE EPISODE, NOT THE 2-WEEK PERIOD IN THE CURRENT MONTH.

IF UNKNOWN: **When did this period of** (depression/OWN WORDS) **begin?**

On most of the days when you were feeling depressed, did you also...

At least two of the above symptoms during the majority of days of the current Major Depressive Episode.

...feel keyed up or tense? (On most of the days?)	1. Feeling keyed up or tense.	?	1	2	3	AS1
...feel unusually restless? (On most of the days?)	2. Feeling unusually restless.	?	1	2	3	AS2
...have trouble concentrating because you were worried about things? (On most of the days?)	3. Difficulty concentrating because of worry.	?	1	2	3	AS3
...feel afraid that something awful may happen? (On most of the days?)	4. Fear that something awful may happen.	?	1	2	3	AS4
...feel that your anxiety or worry would be out of control? (On most of the days?)	5. Feeling that the individual might lose control of [his or her anxiety or worry].	?	1	2	3	AS5

AT LEAST TWO ITEMS ARE CODED "3." AS6

1 → GO TO *WITH PERIPAR-TUM ONSET* BELOW

3 → WITH ANXIOUS DISTRESS; INDICATE CURRENT SEVERITY AS7

IF FOUR OR FIVE SYMPTOMS CODED "3": **On those days on which you were feeling anxious, were you also pacing, moving around a lot, or unable to sit still?**

*Indicate **current severity:*** (circle the appropriate number)

1 **– Mild:** Two symptoms

2 **– Moderate:** Three symptoms

3 **– Moderate-Severe:** Four or five symptoms [without motor agitation]

4 **– Severe:** Four or five symptoms and with motor agitation

WITH PERIPARTUM ONSET

WITH PERIPARTUM ONSET

IF UNKNOWN: **When did** (DEPRESSIVE SXS) **start?**

Onset of mood symptoms occurs during pregnancy or in the 4 weeks following delivery. 0 1 AS8

3 → WITH PERIPARTUM ONSET; INDICATE PERIOD OF ONSET

*Indicate **onset** specifier:* (circle the appropriate number) AS9

1 – **Onset during pregnancy**

2 – **Onset during 4 weeks following delivery**

WITH MIXED FEATURES

MIXED FEATURES SPECIFIER CRITERIA

NOTE: THE TIME FRAME FOR THESE QUESTIONS IS THE ENTIRE DURATION OF CURRENT MAJOR DEPRESSIVE EPISODE.

IF UNKNOWN: **When did this period of** (**depression**/OWN WORDS) **begin?**

On most of the days when you were feeling depressed,...

A. At least three of the following manic/ hypomanic symptoms are present [...] during the majority of days of the current episode of depression:

...was your mood also elevated so that you felt on top of the world? (On most of the days?)	1. Elevated, expansive mood.	?	1	2	3	AS10
...did you also feel more self-confident than usual or like you had special powers or abilities? Did you feel much smarter or better than everyone else? (On most of the days?)	2. Inflated self-esteem or grandiosity.	?	1	2	3	AS11
...were you also much more talkative than usual or feel like you couldn't stop talking? (On most of the days?)	3. More talkative than usual or pressure to keep talking.	?	1	2	3	AS12
...did you have thoughts racing through your head? (What was that like? On most of the days?)	4. Flight of ideas or subjective experience that thoughts are racing.	?	1	2	3	AS13
...were you especially energetic, productive, or busy? (Were you so active that your friends or family were concerned about you? What did you do? On most of the days?)	5. Increase in energy or goal-directed activity (either socially, at work or school, or sexually).	?	1	2	3	AS14
...did you do anything that could have caused trouble for you or your family? (Buying things you didn't need or couldn't afford? Anything sexual that was likely to get you in trouble? Driving recklessly? Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done? On most of the days?)	6. Increased or excessive involvement in activities that have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, foolish business investments).	?	1	2	3	AS15
...did you need less sleep than usual? (How much sleep did you get? On most of the days?)	7. Decreased need for sleep (feeling rested despite sleeping less than usual; to be contrasted with insomnia).	?	1	2	3	AS16

AT LEAST THREE ITEMS ARE CODED "3." 1 3 AS17

GO TO ***WITH CATATONIA*** SEE BELOW

IF UNCLEAR: **Have other people noticed** (SXS CODED "3")? **Are** (SXS CODED "3") **different from the way you usually are?**

B. Mixed symptoms are observable by others and represent a change from the person's usual behavior. ? 1 2 3 AS18

NOTE: Criterion C has been intentionally omitted.

GO TO ***WITH CATATONIA*** SEE BELOW

D. The mixed symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication, or other treatment). ? 1 3 AS19

GO TO ***WITH CATATONIA*** SEE BELOW

CRITERIA A, B, AND D ARE CODED "3." ? 1 3 AS20

WITH MIXED FEATURES

GO TO ***WITH CATATONIA*** SEE BELOW

WITH CATATONIA

CRITERIA FOR CATATONIA ASSOCIATED WITH A MENTAL DISORDER

A. [Three or more of the following are present during most of the current Major Depressive Episode:]

NOTE: Criteria have been regrouped to facilitate assessment

*THE FOLLOWING SIX ITEMS CAN BE ASSESSED BY **OBSERVATION** OR BY REPORTS OF INFORMANTS. (CONSULT PATIENT RECORDS, OTHER OBSERVERS SUCH AS FAMILY MEMBERS, THERAPEUTIC STAFF.)*

1. Stupor (i.e., no psychomotor activity; not actively relating to environment). ? 1 2 3 AS21

DESCRIBE:

2. Grimacing (i.e., odd and inappropriate facial expressions unrelated to situation). ? 1 2 3 AS22

DESCRIBE:

3. Mannerism (i.e., odd, circumstantial caricature of normal actions). ? 1 2 3 AS23

DESCRIBE:

	4. Posturing (i.e., spontaneous and active maintenance of a posture against gravity). DESCRIBE:	?	1	2	3	AS24
	5. Agitation, not influenced by external stimuli. DESCRIBE:	?	1	2	3	AS25
	6. Stereotypy (i.e., repetitive, abnormally frequent, non-goal-directed movements). DESCRIBE:	?	1	2	3	AS26
*THE FOLLOWING THREE ITEMS CAN BE ASSESSED **DURING THE INTERVIEW** OR VIA INFORMANTS.*	7. Mutism (i.e., no, or very little, verbal response [exclude if known aphasia]). DESCRIBE:	?	1	2	3	AS27
	8. Echolalia (i.e., mimicking another's speech). DESCRIBE:	?	1	2	3	AS28
	9. Negativism (i.e., opposition or no response to instructions or external stimuli). DESCRIBE:	?	1	2	3	AS29
*THE FOLLOWING THREE ITEMS CAN BE ASSESSED DURING **PHYSICAL EXAMINATION** OR VIA INFORMANTS.*	10. Echopraxia (i.e., mimicking another's movements). DESCRIBE:	?	1	2	3	AS30
	11. Catalepsy (i.e., passive induction of a posture held against gravity). DESCRIBE:	?	1	2	3	AS31
	12. Waxy flexibility (i.e., slight, even resistance to positioning by examiner). DESCRIBE:	?	1	2	3	AS32
	AT LEAST 3 "A" SYMPTOMS ARE CODED "3" AND ARE PRESENT DURING MOST OF THE CURRENT MAJOR DEPRESSIVE EPISODE.		1	3 WITH CATATONIA		AS33

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

WITH MELANCHOLIC FEATURES

MELANCHOLIC FEATURES CRITERIA

IF UNKNOWN: **During** (PERIOD OF CURRENT EPISODE), **when were you feeling the worst?**

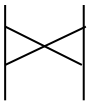
NOTE: When identifying the most severe period, consider entire current episode.

During that time when you were feeling the worst...

A. One of the following is present during the most severe period of the current episode:

IF UNKNOWN: **...did you completely lose interest or pleasure in everything?**

1. Loss of pleasure in all, or almost all activities. ? 1 2 3 AS34



...if something good happened to you or someone tried to cheer you up, did you feel better at least for a while?

2. Lack of reactivity to usually pleasurable stimuli (does not feel much better, even temporarily, when something good happens). ? 1 2 3 AS35

IF NEITHER A.1 NOR A.2 ARE CODED "3," GO TO ***ATYPICAL FEATURES*** A.4.6

During that time when you were feeling the worst...

B. Three (or more) of the following:

...was your feeling of (depression/OWN WORDS) **different from the kind of feeling you would get if someone close to you died? (Or something else bad happened to you?)**

IF YES: **How was it different?**

1. A distinct quality of depressed mood characterized by profound despondency, despair, and/or moroseness or by so-called empty mood. ? 1 2 3 AS36

Did you usually feel worse in the morning than you did the rest of the day?

2. Depression that is regularly worse in the morning. ? 1 2 3 AS37

IF UNKNOWN: **What time did you wake up in the morning? (How much earlier is this than your usual time [before you were depressed]?)**

3. Early morning awakening (i.e., at least 2 hours before usual awakening). ? 1 2 3 AS38

IF UNKNOWN: **Were you talking or moving very slowly during that time, as if you were doing things in slow motion?**

IF UNKNOWN: **How about being extremely restless or unable to sit still? (Were you pacing around a lot or wringing your hands?)**

4. Marked psychomotor agitation or retardation. ? 1 2 3 AS39

IF UNKNOWN: **Did you virtually stop eating or lose a great deal of weight?**

5. Significant anorexia or weight loss. ? 1 2 3 AS40

IF UNKNOWN: **Were you feeling guilty about things you have done or not done?**

6. Excessive or inappropriate guilt. ? 1 2 3 AS41

AT LEAST THREE B ITEMS ARE CODED "3." 1 3 AS42

→ GO TO ***ATYPICAL FEATURES*** A.4.6

CRITERIA A AND B ARE CODED "3." 1 3 AS43

→ **WITH MELANCHOLIC FEATURES**

→ GO TO ***CURRENT MANIC EPISODE*** A.10

WITH ATYPICAL FEATURES ATYPICAL FEATURES CRITERIA

*IF CURRENT EPISODE MEETS CRITERIA FOR MELANCHOLIC FEATURES OR CATATONIA, CHECK HERE ____ AND GO TO ***CURRENT MANIC EPISODE*** A.10.* AS44

NOTE: THE TIME FRAME FOR THESE QUESTIONS IS THE ENTIRE DURATION OF CURRENT MAJOR DEPRESSIVE EPISODE.

The following features must predominate during the majority of days of the current Major Depressive Episode.

IF UNKNOWN: **When did your period of (depression**/OWN WORDS**) begin?**

On most of the days that you have been feeling depressed...

...if something good happened to you or if someone tried to cheer you up, did you feel better, at least for a while?

A. Mood reactivity (i.e., mood brightens in response to actual or potential positive events). ? 1 2 3 AS45

→ GO TO ***CURRENT MANIC EPISODE*** A.10

On most of the days that you have been feeling depressed...

B. Two (or more) of the following features:

IF UNKNOWN: **...did your appetite increase a lot or did you gain a lot of weight? (How much? On most of the days?)**

1. Significant weight gain or increase in appetite. ? 1 2 3 AS46

...how many hours (in a 24-hour period) did you usually sleep (including naps)? (On most of the days?)

2. Hypersomnia. ? 1 2 3 AS47

NOTE: Code "3" if more than 10 hours a day or if at least 2 hours more than when not depressed.

...did your arms or legs often feel heavy (as though they were full of lead)? (On most of the days?)

3. Leaden paralysis (i.e., heavy, leaden feelings in arms or legs). ? 1 2 3 AS48

On most of the days that you have been feeling depressed...

...did you feel especially sensitive to how others treated you? (What happened to you when someone rejected, criticized or slighted you? Did you get very down or angry? For how long? How did this affect you? Was your reaction more extreme than most people's? Did you avoid doing things or being with people because you were afraid of being criticized or rejected? On most of the days?)

4. A long-standing pattern of interpersonal rejection sensitivity (not limited to episodes of mood disturbance) that results in significant social or occupational impairment. ? 1 2 3 AS49

AT LEAST TWO "B" ITEMS ARE CODED "3." 1 3 AS50

→ GO TO ***CURRENT MANIC EPISODE*** A.10

C. Criteria are not met for "With Melancholic Features" or "With Catatonia" during the same episode. 1 3 AS51

→ GO TO ***CURRENT MANIC EPISODE*** A.10

CRITERIA A, B, AND C ARE CODED "3." 1 3 AS52

→ WITH ATYPICAL FEATURES

→ GO TO ***CURRENT MANIC EPISODE*** A.10

PAST MAJOR DEPRESSIVE EPISODE

NOTE: IF CURRENTLY DEPRESSED MOOD OR LOSS OF INTEREST BUT FULL CRITERIA ARE NOT MET FOR A MAJOR DEPRESSIVE EPISODE, SUBSTITUTE THE PHRASE **"Has there ever been ***another*** time..."** *IN EACH OF THE SCREENING QUESTIONS BELOW.*

Have you ***ever* had a period when you were feeling depressed or down most of the day nearly every day? (Did anyone say that you looked sad, down, or depressed?)**

IF NO: **How about feeling sad, empty or hopeless, most of the day nearly every day?**

IF YES TO EITHER OF ABOVE: **What was that like? When was that? How long did it last? (As long as 2 weeks?)**

IF PREVIOUS ITEM CODED "3": **During that time, did you lose interest or pleasure in things you usually enjoyed? (What was that like?)**

IF PREVIOUS ITEM NOT CODED "3": **Have you ever had a period when you lost interest or pleasure in things you usually enjoyed? (What was that like?)**

IF YES: **When was that? Was it nearly every day? How long did it last? (As long as 2 weeks?)**

Have you had more than one time like that? (Which time was the worst?)

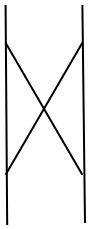
IF UNCLEAR: **Have you had any times like that in the past year, since** (1 YEAR AGO)**?**

MAJOR DEPRESSIVE EPISODE CRITERIA

A. Five or more of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms was either (1) depressed mood or (2) loss of interest or pleasure.

1. Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad, empty, hopeless) or observation made by others (e.g., appears tearful). NOTE: in children and adolescents, can be irritable mood.

? 1 2 3 A27



2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated either by subjective account or observation).

? 1 2 3 A28

IF NEITHER ITEM A.1 NOR A.2 IS CODED "3," GO TO ***CURRENT MANIC EPISODE*** A.10

NOTE: If there is evidence for more than one past episode, select the "worst" one for your inquiry about past Major Depressive Episode. If there was a likely Major Depressive Episode in the past year, ask about that episode even if it was not the worst.

FOR THE FOLLOWING QUESTIONS, FOCUS ON THE WORST 2 WEEKS OF THE PAST MAJOR DEPRESSIVE EPISODE THAT YOU ARE INQUIRING ABOUT.

NOTE: When rating the following items, code "1" if clearly directly due to a general medical condition (e.g., insomnia due to severe back pain).

During that (2-WEEK PERIOD)**...**

...how was your appetite? (What about compared to your usual appetite? Did you have to force yourself to eat? Eat [less/more] than usual? <u>Was that nearly every day?</u> Did you lose or gain any weight? How much? *IF YES*: **Were you trying to [lose/gain] weight?)**	3. Significant weight loss when not dieting, or weight gain (e.g., a change of more than 5% of body weight in a month) or decrease or increase in appetite nearly every day. *Check if*: ____ weight loss or decreased appetite ____ weight gain or increased appetite	?	1	2	3	A29 A30 A31
...**how were you sleeping? (Trouble falling asleep, waking frequently, trouble staying asleep, waking too early, OR sleeping too much? How many hours of sleep (including naps) had you been getting? How many hours of sleep did you typically get before you got** (**depressed**/OWN WORDS)**? <u>Has it been nearly every night?</u>**	4. Insomnia or hypersomnia nearly every day. *Check if*: ____ insomnia ____ hypersomnia	?	1	2	3	A32 A33 A34
...were you so fidgety or restless that you were unable to sit still? What about the opposite—talking more slowly, or moving more slowly than was normal for you, as if you were moving through molasses or mud? (In either instance, was it so bad that other people have noticed it? What did they notice? <u>Was that nearly every day?</u>)	5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down). *Check if*: ____ psychomotor agitation ____ psychomotor retardation	?	1	2	3	A35 A36 A37
...**what was your energy level like? (Tired all the time? <u>Nearly every day?</u>)**	6. Fatigue or loss of energy nearly every day	?	1	2	3	A38
...were you feeling worthless? **Did you feel guilty about things you had done or not done?** *IF YES*: **What things? (Was this only because you couldn't take care of things since you have been sick?)** *IF YES TO EITHER OF ABOVE:* **<u>Nearly every day?</u>**	7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick). *Check if*: ____ worthlessness ____ inappropriate guilt	?	1	2	3	A39 A40 A41
...did you have trouble thinking or concentrating? Was it hard to make decisions about everyday things? (What kinds of things did it interfere with?) <u>Nearly every day?</u>	8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).	?	1	2	3	A42

During that (2-WEEK PERIOD)**...**

...were things so bad that you thought a lot about death or that you would be better off dead? Did you think about taking your own life?

IF YES: **Did you do something about it? (What did you do? Did you make a specific plan? Did you take any action to prepare for it? Did you actually make a suicide attempt?)**

9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide. ? 1 2 3 A43

NOTE: Code "1" for self-mutilation without suicidal intent.

Check if:

___ thoughts of own death A44
___ suicidal ideation A45
___ specific plan A46
___ suicide attempt A47

AT LEAST FIVE OF THE ABOVE SXS (A.1–A.9) ARE CODED "3" AND AT LEAST ONE OF THESE IS ITEM A.1 OR A.2. 1 3 A48

IF NOT ALREADY ASKED: **Has there been any other time when you were** (**depressed**/OWN WORDS) **and had even more of the symptoms that I just asked you about?**

→ *IF YES: RETURN TO* ***PAST MAJOR DEPRESSIVE EPISODE*** *A.5, AND CHECK WHETHER THERE HAVE BEEN ANY OTHER MAJOR DEPRESSIVE EPISODES THAT WERE MORE SEVERE AND/OR CAUSED MORE SYMPTOMS. IF SO, ASK ABOUT THAT EPISODE.*

→ *IF NO: GO TO* ***CURRENT MANIC EPISODE*** *A.10.*

CONTINUE WITH NEXT ITEM, CRITERION B, NEXT PAGE

IF UNKNOWN: **What effect did** (DEPRESSIVE SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION B:

How did (DEPRESSIVE SXS) **affect your relationships or your interactions with other people? (Did this cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (DEPRESSIVE SXS) **affect your work/school? (How about your attendance at work or school? Did** [DEPRESSIVE SXS] **make it more difficult to do your work/schoolwork? How did** [DEPRESSIVE SXS] **affect the quality of your work/schoolwork?)**

How did (DEPRESSIVE SXS) **affect your ability to take care of things at home? (How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?)**

Did (DEPRESSIVE SXS) **affect any other important part of your life?**

IF DID NOT INTERFERE WITH LIFE: **How much were you bothered or upset by having** (DEPRESSIVE SXS)**?**

B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A49

IF NOT ALREADY ASKED: **Has there been any other time when you were** (**depressed**/OWN WORDS) **and it caused even more problems than the time I just asked you about?**

IF YES: RETURN TO ****PAST MAJOR DEPRESSIVE EPISODE**** *A.5, AND CHECK WHETHER THERE HAVE BEEN ANY OTHER MAJOR DEPRESSIVE EPISODES THAT WERE MORE SEVERE AND/OR CAUSED MORE SYMPTOMS. IF SO, ASK ABOUT THAT EPISODE.*

IF NO: GO TO ****CURRENT MANIC EPISODE**** *A.10.*

CONTINUE ON NEXT PAGE

IF UNKNOWN: **When did this period of (depression**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

C. [Primary Depressive Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition (e.g., hypothyroidism).

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.

? 1 3 A50

DUE TO SUBSTANCE USE OR GMC

PRIMARY DEPRESSIVE EPISODE

IF UNKNOWN: **Has there been any other time when you were having** (DEPRESSIVE SXS) **like this but were not** (**using** SUBSTANCE/MEDICATION/**ill with GMC**)**?**

IF YES: GO TO ***PAST MAJOR DEPRESSIVE EPISODE*** *A.5 AND CHECK WHETHER THERE HAS BEEN ANY OTHER MAJOR DEPRESSIVE EPISODE NOT DUE TO A SUBSTANCE/MEDICATION OR ANOTHER MEDICAL CONDITION. IF SO, ASK ABOUT THAT EPISODE.*

IF NO: GO TO ***CURRENT MANIC EPISODE*** *A.10*

CONTINUE WITH NEXT ITEM

MAJOR DEPRESSIVE EPISODE CRITERIA A, B, AND C ARE CODED "3."

1 3 A51

GO TO ***CURRENT MANIC EPISODE*** A.10

PAST MAJOR DEPRESSIVE EPISODE

How old were you when (PAST MAJOR DEPRESSIVE EPISODE) **started?**

Age-at-onset of Past Major Depressive Episode coded above. ____ ____ A52

How many separate times in your life have you been (**depressed**/OWN WORDS) **nearly every day for at least 2 weeks and had several of the symptoms that you described like** (SXS OF WORST EPISODE)**?**

Total number of Major Depressive Episodes (CODE 99 IF TOO NUMEROUS OR INDISTINCT TO COUNT). ____ ____ A53

CURRENT MANIC EPISODE

Since (1 MONTH AGO)**, has there been a period of time when you were feeling so good, "high," excited, or "on top of the world" that other people thought you were not your normal self?**

IF YES: **What has it been like? (More than just feeling good?)**

Have you also been feeling like you were "hyper" or "wired" and had an unusual amount of energy? Have you been much more active than is typical for you? (Have other people commented on how much you have been doing?)

IF NO: **Since** (1 MONTH AGO)**, have you had a period of time when you were feeling irritable, angry, or short-tempered most of the day, nearly every day, for at least several days? What has it been like? (Is that different from the way you usually are?)**

IF YES: **Have you also been feeling like you were "hyper" and had an unusual amount of energy? Have you been much more active than is typical for you? (Have other people commented on how much you have been doing?)**

How long has this lasted? (As long as 1 week?)

IF LESS THAN 1 WEEK: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

Have you been feeling (high/irritable/OWN WORDS) **for most of the day, nearly every day during this time?**

FOCUS ON THE MOST SEVERE WEEK IN THE PAST MONTH OF THE CURRENT EPISODE FOR THE FOLLOWING QUESTIONS.

IF UNCLEAR: **During** (EPISODE)**, when were you the most (high/irritable**/OWN WORDS)**?**

During that time...

...how did you feel about yourself?

(More self-confident than usual? Did you feel much smarter or better than everyone else? Did you feel like you had any special powers or abilities?)

...did you need less sleep than usual? (How much sleep did you get?)

IF YES: **Did you still feel rested?**

MANIC EPISODE CRITERIA

A. A distinct period [lasting at least several days] of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased [...] activity or energy. ? 1 2 3 A54

GO TO ***PAST MANIC EPISODE*** A.18

Check if:

___ elevated, expansive mood A55

___ irritable mood A56

...lasting at least 1 week and present most of the day, nearly every day (or any duration if hospitalization is necessary). ? 1 2 3 A57

NOTE: If elevated mood lasts less than 1 week, check whether irritable mood lasts at least 1 week before skipping to A.14.

GO TO ***CURRENT HYPOMANIC EPISODE*** A.14

B. During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms have persisted (four if the mood is only irritable) and have been present to a significant degree and represent a noticeable change from usual behavior:

1. Inflated self-esteem or grandiosity. ? 1 2 3 A58

2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep). ? 1 2 3 A59

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

During that time...

...were you much more talkative than usual? (Did people have trouble stopping you or understanding you? Did people have trouble getting a word in edgewise?)	3. More talkative than usual or pressure to keep talking.	?	1	2	3	A60
...did you have thoughts racing through your head? (What was that like?)	4. Flight of ideas or subjective experience that thoughts are racing.	?	1	2	3	A61
...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)	5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli) as reported or observed.	?	1	2	3	A62
...how did you spend your time? (Work, friends, hobbies? Were you especially busy during that time?) **(Did you find yourself more enthusiastic at work or working harder at your job? What about being more engaged in school activities or studying harder?)** **(Were you more sociable during that time, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)** **(Were you spending more time thinking about sex or involved in doing something sexual, by yourself or with others? Was that a big change for you?)** **Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still? (How bad was it?)**	6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation (i.e., purposeless non-goal-directed activity). *Check if*: ___ increase in activity ___ psychomotor agitation	?	1	2	3	A63 A64 A65
...were you doing anything that could have caused trouble for you or your family? **(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)** **(Anything sexual that was likely to get you in trouble? Driving recklessly?)** **(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)**	7. Excessive involvement in activities that have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments).	?	1	2	3	A66

AT LEAST THREE "B" SXS ARE CODED "3" (FOUR IF MOOD ONLY IRRITABLE).

1 3 A67

GO TO ***PAST MANIC EPISODE*** A.18

IF UNKNOWN: **What effect have these** (MANIC SXS) **had on your life?**

IF UNKNOWN: **Have you needed to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION C.

How have (MANIC SXS) **affected your relationships or your interactions with other people? (Have** (MANIC SXS) **caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (MANIC SXS) **affected your work/ school? (How about your attendance at work or school? Did** [MANIC SXS] **make it more difficult to do your work/ schoolwork? How have** [MANIC SXS] **affected the quality of your work/ schoolwork?)**

How have (MANIC SXS) **affected your ability to take care of things at home?**

C. The mood disturbance is sufficiently severe to cause marked impairment in social or occupational functioning or to necessitate hospitalization to prevent harm to self or others, or there are psychotic features.

? 1 2 3 A68

GO TO ***CURRENT HYPOMANIC CRITERION C*** A.16

NOTE: Code "3" if psychotic symptoms have been present. You may need to return here to recode after screening for psychotic symptoms in Module B.

DESCRIBE:

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

D. [Primary Manic Episode:] The episode is not attributable to the physiological effects of a substance (i.e., a drug of abuse, medication) or to another medical condition.

A69

? 1 3

PRIMARY MANIC EPISODE

IF THERE IS ANY INDICATION THAT MANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF A GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.41 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

DUE TO SUBSTANCE USE OR GMC, GO TO ***PAST MANIC EPISODE*** A.18

NOTE: A full Manic Episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a Manic Episode and, therefore, a Bipolar I diagnosis.

CONTINUE WITH NEXT ITEM

Etiological medical conditions include: Alzheimer's disease, vascular dementia, HIV-induced dementia, Huntington's disease, Lewy body disease, Wernicke-Korsakoff, Cushing's disease, multiple sclerosis, ALS, Parkinson's disease, Pick's disease, Creutzfelt-Jakob disease, stroke, traumatic brain injuries, hyperthyroidism

Etiological substances/medications include: alcohol (I/W), phencyclidine (I), hallucinogens (I), sedatives, hypnotics, anxiolytics (I/W), amphetamines (I/W), cocaine (I/W), corticosteroids, androgens, isoniazid, levodopa, interferon alpha, varenicline, procarbazine, clarithromycin, ciprofloxacin

.

MANIC EPISODE CRITERIA A, B, C, AND D ARE CODED "3."

A70

1 3

GO TO ***PAST MANIC EPISODE*** A.18

CURRENT MANIC EPISODE

WITH ANXIOUS DISTRESS

ANXIOUS DISTRESS SPECIFIER CRITERIA

NOTE: THE TIMEFRAME FOR THESE QUESTIONS IS THE ENTIRE DURATION OF THE CURRENT MANIC EPISODE, NOT THE 1-WEEK PERIOD IN THE CURRENT MONTH.

IF UNKNOWN: **When did this period of** (**high/irritable**/OWN WORDS) **begin?**

On most of the days when you were feeling (**high/irritable**/OWN WORDS)**, did you also...**

At least two of the following symptoms during the majority of days of the current Manic Episode:

...feel keyed up or tense? (On most of the days?)	1. Feeling keyed up or tense.	?	1	2	3	AS53
...feel unusually restless? (On most of the days?)	2. Feeling unusually restless.	?	1	2	3	AS54
...have trouble concentrating because you were worrying about things? (On most of the days?)	3. Difficulty concentrating because of worry.	?	1	2	3	AS55
...feel afraid that something awful was going to happen? (On most of the days?)	4. Fear that something awful may happen.	?	1	2	3	AS56
...feel that your anxiety or worry would be out of control? (On most of the days?)	5. Feeling that the individual might lose control of [his or her anxiety or worry].	?	1	2	3	AS57

AT LEAST TWO ITEMS ARE CODED "3." 1 3 AS58

- 1 → GO TO ***PERIPARTUM ONSET*** BELOW
- 3 → WITH ANXIOUS DISTRESS; INDICATE CURRENT SEVERITY

IF FOUR OR FIVE SYMPTOMS CODED "3": **On those days on which you were feeling anxious, were you also pacing, moving around a lot or unable to sit still?**

*Indicate **current severity:*** (circle the appropriate number) AS59

1 – **Mild**: Two symptoms

2 – **Moderate:** Three symptoms

3 – **Moderate-Severe:** Four or five symptoms [without motor agitation]

4 – **Severe:** Four or five symptoms and with motor agitation

WITH PERIPARTUM ONSET

WITH PERIPARTUM ONSET

IF UNKNOWN: **When did** (MANIC SXS) **start?**

Onset of mood symptoms occurs during pregnancy or in the 4 weeks following delivery. 1 3 AS60

- 3 → WITH PERIPARTUM ONSET; INDICATE PERIOD OF ONSET

*Indicate **onset** specifier:* AS61

1 – **Onset during pregnancy**.

2 – **Onset during 4 weeks following delivery**.

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

WITH MIXED FEATURES

MIXED FEATURES SPECIFIER CRITERIA

NOTE: THE TIME FRAME FOR THESE QUESTIONS IS THE ENTIRE DURATION OF THE CURRENT MANIC EPISODE, NOT THE 1-WEEK PERIOD IN THE CURRENT MONTH.

IF UNKNOWN: **When did this period of being (high/irritable**/OWN WORDS) **begin?**

On most of the days when you were feeling (high/irritable/OWN WORDS)**, did you also...**

A. At least three of the following symptoms are present during the majority of days of the current Manic Episode:

...feel depressed, sad, down, or empty? (On most of the days?)	1. Prominent dysphoria or depressed mood as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful).	?	1	2	3	AS62
...lose interest or pleasure in things you usually enjoyed? (On most of the days?)	2. Diminished interest or pleasure in all, or almost all, activities (as indicated by either subjective account or observation made by others).	?	1	2	3	AS63
...talk or move more slowly than is normal for you? (Was it so bad that other people noticed it? What did they notice? On most of the days?)	3. Psychomotor retardation nearly every day (observable by others; not merely subjective feelings of being slowed down).	?	1	2	3	AS64
...feel very tired or like your energy level was very low? (On most of the days?)	4. Fatigue or loss of energy.	?	1	2	3	AS65
...feel worthless? *IF NO*: **What about feeling guilty about things you have done or not done?** *IF YES*: **What things? (Was this only because you couldn't take care of things since you have been sick?)**	5. Feelings of worthlessness or excessive or inappropriate guilt (not merely self-reproach or guilt about being sick).	?	1	2	3	AS66

IF YES TO EITHER: **On most of the days?**

...were things so bad that you thought a lot about death or that you would be better off dead? Did you think about taking your own life? On most of the days?)

IF YES: **Did you do something about it? (What did you do? Did you make a specific plan? Did you take any action to prepare for it? Did you actually make a suicide attempt?)**

6. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide. ? 1 2 3 AS67

NOTE: Any current suicidal thoughts, plans, or actions should be thoroughly assessed by the clinician and action taken if necessary.

AT LEAST THREE "A" ITEMS ARE CODED "3." 1 3 AS68

→ GO TO ***WITH CATATONIA *** BELOW

IF UNCLEAR: **Have other people noticed** (SXS CODED "3")? **Are** (SXS CODED "3") **different from the way you usually are?**

B. Mixed symptoms are observable by others and represent a change from the person's usual behavior. 1 2 3 AS69

→ GO TO ***WITH CATATONIA *** BELOW

NOTE: Criterion C has been intentionally omitted.

D. The mixed symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication or other treatment) ? 1 3 AS70

→ GO TO ***WITH CATATONIA *** BELOW

CRITERIA A, B, AND D ARE CODED "3." ? 1 3 AS71

→ WITH MIXED FEATURES

WITH CATATONIA

CRITERIA FOR CATATONIA ASSOCIATED WITH A MENTAL DISORDER

A. [Three or more of the following are present during most of the current Manic Episode:]

NOTE: Criteria items have been regrouped to facilitate assessment

*THE FOLLOWING SIX ITEMS CAN BE ASSESSED BY **OBSERVATION** OR BY REPORTS OF INFORMANTS (CONSULT PATIENT RECORDS, OTHER OBSERVERS SUCH AS FAMILY MEMBERS, THERAPEUTIC STAFF).*

1. Stupor (i.e., no psychomotor activity; not actively relating to environment). ? 1 2 3 AS72

DESCRIBE:

2. Grimacing (i.e., odd and inappropriate facial expressions unrelated to situation). ? 1 2 3 AS73

DESCRIBE:

	3. Mannerism (i.e., odd, circumstantial caricature of normal actions).	?	1	2	3	AS74
	DESCRIBE:					
	4. Posturing (i.e., spontaneous and active maintenance of a posture against gravity).	?	1	2	3	AS75
	DESCRIBE:					
	5. Agitation, not influenced by external stimuli.	?	1	2	3	AS76
	DESCRIBE:					
	6. Stereotypy (i.e., repetitive, abnormally frequent, non-goal-directed movements).	?	1	2	3	AS77
	DESCRIBE:					
*THE FOLLOWING THREE ITEMS CAN BE ASSESSED **DURING THE INTERVIEW** OR VIA INFORMANTS.*	7. Mutism (i.e., no, or very little, verbal response [exclude if known aphasia]).	?	1	2	3	AS78
	DESCRIBE:					
	8. Echolalia (i.e., mimicking another's speech).	?	1	2	3	AS79
	DESCRIBE:					
	9. Negativism (i.e., opposition or no response to instructions or external stimuli).	?	1	2	3	AS80
	DESCRIBE:					
*THE FOLLOWING THREE ITEMS CAN BE ASSESSED DURING **PHYSICAL EXAMINATION** OR VIA INFORMANTS.*	10. Echopraxia (i.e., mimicking another's movements).	?	1	2	3	AS81
	DESCRIBE:					
	11. Catalepsy (i.e., passive induction of a posture held against gravity).	?	1	2	3	AS82
	DESCRIBE:					
	12. Waxy flexibility (i.e., slight, even resistance to positioning by examiner).	?	1	2	3	AS83
	DESCRIBE:					
	AT LEAST 3 "A" SYMPTOMS ARE CODED "3" AND ARE PRESENT DURING MOST OF THE CURRENT MANIC EPISODE.		1		3	AS84

WITH CATATONIA

CURRENT HYPOMANIC EPISODE

HYPOMANIC EPISODE CRITERIA

*IF CRITERIA ARE MET FOR A CURRENT MANIC EPISODE, CHECK HERE_____ AND GO TO ***PREMENSTRUAL DYSPHORIC DISORDER**** *A.36*. A71

Has the period when you were feeling (**high/irritable**/OWN WORDS)**, lasted for at least 4 days? Has it lasted for most of the day, nearly every day?**

A. A distinct period of abnormally and persistently elevated, expansive or irritable mood and abnormally and persistently increased activity or energy, lasting at least 4 consecutive days, and present most of the day, nearly every day. ? 1 2 3 A72

GO TO ***PAST MANIC EPISODE*** A.18

Check if:

___ elevated, expansive mood A73
___ irritable mood A74

Have you had more than one time like that since (1 MONTH AGO)**? (Which one was the most extreme?)**

FOCUS ON THE MOST EXTREME PERIOD IN THE PAST MONTH OF THE CURRENT EPISODE FOR THE FOLLOWING QUESTIONS.

B. During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms (four if the mood is only irritable) have persisted, represent a noticeable change from usual behavior, and have been present to a significant degree and represent a noticeable change from usual behavior:

(During that time...)

...how were you feeling about yourself? (More self-confident than usual?) (Did you feel much smarter or better than everyone else?) (Did you feel like you had any special powers or abilities?)

1. Inflated self-esteem or grandiosity. ? 1 2 3 A75

...did you need less sleep than usual? (How much sleep were you getting?)

IF YES: **Were you still feeling rested?**

2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep). ? 1 2 3 A76

...were you much more talkative than usual? (Did people have trouble stopping you, understanding you, or getting a word in edgewise?)

3. More talkative than usual or pressure to keep talking. ? 1 2 3 A77

...did you have thoughts racing through you head? (What was that like?)

4. Flight of ideas or subjective experience that thoughts are racing. ? 1 2 3 A78

...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)

5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli), as reported or observed. ? 1 2 3 A79

During that time...

...how were you spending your time? (Work, friends, hobbies? Were you been especially productive or busy?

(Were you finding yourself more enthusiastic at work or working harder at your job? What about being more engaged in school activities or studying harder?)

(Were you more sociable, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)

(Were you spending more time thinking about sex or doing something sexual, by yourself or with others? Was this a big change for you?)

Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still? (How bad was it?)

6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation. ? 1 2 3 A80

Check if:

___ increase in activity A81
___ psychomotor agitation A82

...were you doing anything that could have caused trouble for you or your family?

(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)

(Anything sexual that was likely to get you in trouble? Driving recklessly?)

(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)

7. Excessive involvement in activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments) ? 1 2 3 A83

AT LEAST THREE "B" SXS ARE CODED "3" (FOUR IF MOOD ONLY IRRITABLE). 1 3 A84

NOTE: Because of the inherent difficulty in distinguishing normal periods of good mood from hypomania, review all items coded "3" in criterion B and recode any equivocal judgments.

GO TO ***PAST MANIC EPISODE*** A.18

CURRENT HYPOMANIC CRITERION C

IF UNKNOWN: **Was this very different from the way you usually are when you're not** (**high/irritable**/OWN WORDS)**? (How were you different? At work? With friends?)**

C. The episode is associated with an unequivocal change in functioning that is uncharacteristic of the individual when not symptomatic.

? 1 2 3 A85

→ GO TO ***PAST MANIC EPISODE*** A.18

IF UNKNOWN: **Did other people notice the change in you? (What did they say?)**

D. The disturbance in mood and the change in functioning are observable by others.

? 1 2 3 A86

→ GO TO ***PAST MANIC EPISODE*** A.18

IF UNKNOWN: **What effect have these** (HYPOMANIC SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E.

How have (HYPOMANIC SXS) **affected your relationships or your interactions with other people? (Has this caused any problems in your relationships with your family, romantic partner or friends?)**

How have (HYPOMANIC SXS) **affected your school/work? (How about your attendance at work or school? Did** [HYPOMANIC SXS] **make it more difficult to do your work/schoolwork? How have** [HYPOMANIC SXS] **affected the quality of your work/schoolwork?)**

How has this affected your ability to take care of things at home?

IF UNKNOWN: **Have you needed to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

E. The episode is not severe enough to cause marked impairment in social or occupational functioning, or to necessitate hospitalization, and there are no psychotic features.

NOTE: Code "1" if markedly impairing symptoms, if hospitalization is necessary, or if there are psychotic symptoms.

? 1 2 3 A87

→ SXS NOT SEVERE ENOUGH FOR A DX OF MANIC EPISODE

→ CONTINUE ON NEXT PAGE

IF SEVERE ENOUGH TO REQUIRE HOSPITALIZATION OR SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT AND DURATION WAS AT LEAST 1 WEEK, CHECK HERE ___ AND GO TO A.10 AND TRANSCRIBE B CRITERION SYMPTOM RATINGS AND CONTINUE WITH RATINGS FOR CURRENT MANIC EPISODE. A88

IF SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT BUT LASTED LESS THAN 1 WEEK, CHECK HERE ____ AND GO TO ***PAST MANIC EPISODE*** A.18. IF CRITERIA ARE NOT MET FOR A PAST MANIC EPISODE, CODE "OTHER BIPOLAR DISORDER" FOR THIS SEVERE BUT BRIEF EPISODE, AND INDICATE TYPE 5 ON D.8. A89

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

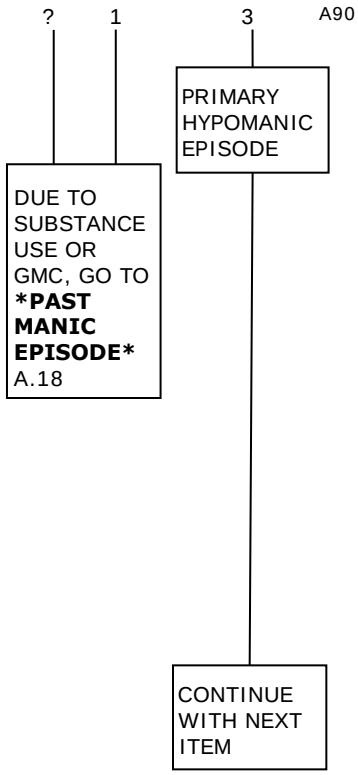
F. [Primary Hypomanic Episode:] The episode is not attributable to the physiological effects of a substance/medication or to another medical condition.

IF THERE IS ANY INDICATION THAT THE HYPOMANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: A full Hypomanic Episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a Hypomanic Episode diagnosis. However, caution is indicated so that one or two symptoms (particularly increased irritability, edginess, or agitation following antidepressant use) are neither taken as sufficient for diagnosis of a hypomanic episode, nor necessarily indicative of a bipolar diathesis.

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

HYPOMANIC EPISODE CRITERIA A, B, C, D, E, AND F ARE CODED "3."



WITH ANXIOUS DISTRESS

ANXIOUS DISTRESS SPECIFIER CRITERIA

NOTE: THE TIME FRAME FOR THESE QUESTIONS IS THE ENTIRE DURATION OF THE CURRENT HYPOMANIC EPISODE, NOT THE 4-DAY PERIOD IN THE CURRENT MONTH.

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

On most of the days when you were feeling (**high/irritable**/OWN WORDS), **did you also...**

At least two of the following symptoms during the majority of days of the current Hypomanic Episode:

...feel keyed up or tense? (On most of the days?)	1. Feeling keyed up or tense.	?	1	2	3	AS85
...feel unusually restless? (On most of the days?)	2. Feeling unusually restless.	?	1	2	3	AS86
...have trouble concentrating because you were worrying about things? (On most of the days?)	3. Difficulty concentrating because of worry.	?	1	2	3	AS87
...feel afraid that something awful was going to happen? (On most of the days?)	4. Fear that something awful may happen.	?	1	2	3	AS88
...feel that your anxiety or worry would be out of control? (On most of the days?)	5. Feeling that the individual might lose control of [his or her anxiety or worry].	?	1	2	3	AS89
	AT LEAST TWO ITEMS ARE CODED "3."		1		3	AS90

CONTINUE ON NEXT PAGE

WITH ANXIOUS DISTRESS; INDICATE CURRENT SEVERITY

IF FOUR OR FIVE SYMPTOMS CODED "3": **On those days on which you were feeling anxious, were you also pacing, moving around a lot or unable to sit still?**

*Indicate **current severity***: (circle the appropriate number) AS91

1 – **Mild:** Two symptoms

2 – **Moderate:** Three symptoms

3 – **Moderate-Severe:** Four or five symptoms [without motor agitation]

4 – **Severe:** Four or five symptoms and with motor agitation

WITH PERIPARTUM ONSET

IF UNKNOWN: **When did** (HYPOMANIC SXS) **start?**

WITH PERIPARTUM ONSET

Onset of mood symptoms occurs during pregnancy or in the 4 weeks following delivery.

*Indicate **onset** specifier:* (circle the appropriate number)

1 – **Onset during pregnancy**.

2 – **Onset during 4 weeks following delivery**.

1 3 AS92

WITH PERIPARTUM ONSET; INDICATE PERIOD OF ONSET AS93

WITH MIXED FEATURES

NOTE: THE TIME FRAME FOR THESE QUESTIONS IS THE ENTIRE DURATION OF THE CURRENT HYPOMANIC EPISODE, NOT THE 4-DAY PERIOD IN THE CURRENT MONTH.

IF UNKNOWN: **When did this period of being (high/irritable**/OWN WORDS**) begin?**

On most of the days when you were feeling (high/irritable/OWN WORDS**), did you also…**

MIXED FEATURES SPECIFIER CRITERIA

A. At least three of the following symptoms are present during the majority of days of the current Hypomanic Episode

…feel depressed, sad, down or empty? (On most of the days?)	1. Prominent dysphoria or depressed mood as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful).	?	1	2	3	AS94
…lose interest or pleasure in things you usually enjoyed? (On most of the days?)	2. Diminished interest or pleasure in all, or almost all, activities (as indicated by either subjective account or observation made by others).	?	1	2	3	AS95
…talk or move more slowly than was normal for you? (Was it so bad that other people noticed it? What did they notice? On most of the days?)	3. Psychomotor retardation nearly every day (observable by others; not merely subjective feelings of being slowed down).	?	1	2	3	AS96
…feel very tired or like your energy level was very low? (On most of the days?)	4. Fatigue or loss of energy.	?	1	2	3	AS97
…feel worthless? *IF NO*: **What about feeling guilty about things you have done or not done?** *IF YES*: **What things? (Was this only because you couldn't take care of things since you have been sick?)**	5. Feelings of worthlessness or excessive or inappropriate guilt (not merely self-reproach or guilt about being sick).	?	1	2	3	AS98

IF YES TO EITHER: **On most of the days?**

...were things so bad that you thought a lot about death or that you would be better off dead? Did you think about taking your own life? (On most of the days?)

IF YES: **Did you do something about it? (What did you do? Did you make a specific plan? Did you take any action to prepare for it? Did you actually make a suicide attempt?)**

6. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide. ? 1 2 3 AS99

NOTE: Any current suicidal thoughts, plans, or actions should be thoroughly assessed by the clinician and action taken if necessary.

AT LEAST THREE "A" ITEMS ARE CODED "3." 1 3 AS100

→ GO TO ***PAST MANIC EPISODE*** A.18

IF UNCLEAR: **Have other people noticed** (SXS CODED "3")? **Are** (SXS CODED "3") **different from the way you usually are?**

B. Mixed symptoms are observable by others and represent a change from the person's usual behavior. ? 1 2 3 AS101

→ GO TO ***PAST MANIC EPISODE*** A.18

NOTE: Criterion C has been intentionally omitted.

D. The mixed symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication, or other treatment). ? 1 3 AS102

→ GO TO ***PAST MANIC EPISODE*** A.18

CRITERION A, B, AND D ARE CODED "3." ? 1 3 AS103

→ WITH MIXED FEATURES

→ GO TO ***PAST MANIC EPISODE*** A.18

PAST MANIC EPISODE

NOTE: IF CURRENTLY ELEVATED OR IRRITABLE MOOD BUT FULL CRITERIA ARE NOT MET FOR A MANIC EPISODE, SUBSTITUTE THE PHRASE **"Has there ever been ***another*** time ..."** *IN EACH OF THE SCREENING QUESTIONS BELOW*.

Have you ***ever* had a period of time when you were feeling so good, "high," excited, or "on top of the world" that other people thought you were not your normal self?**

IF YES: **What was it like? (Was that more than just feeling good?) Did you also feel like you were "hyper" or "wired" and had an unusual amount of energy? Were you much more active than is typical for you? (Did other people comment on how much you were doing?)**

IF NO: **Have you ***ever*** had a period of time when you were feeling irritable, angry, or short-tempered for most of the day, every day, for at least several days? What was that like? (Was that different from the way you usually are?)**

IF YES: **Did you also feel like you were "hyper" or "wired" and had an unusual amount of energy? Were you much more active than is typical for you? (Did other people comment on how much you were doing?)**

When was that?

How long did that last? (As long as 1 week?)

IF LESS THAN 1 WEEK: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?)**

Did you feel (**high/irritable**/OWN WORDS) **for most of the day, nearly every day during this time?**

Have you had more than one time like that? (Which time was the most extreme?)

IF UNCLEAR: **Have you had any times like that in the past year, since** (1 YEAR AGO)**?**

MANIC EPISODE CRITERIA

A. A distinct period [lasting at least several days] of abnormally and persistently elevated, expansive or irritable mood and abnormally and persistently increased [...] activity or energy.

Check if:

___ elevated, expansive mood
___ irritable mood

? 1 2 3 A92

GO TO *__CURRENT CYCLOTHYMIC DISORDER*__ A.28

A93
A94

...lasting at least 1 week and present most of the day, nearly every day (or any duration if hospitalization is necessary).

? 1 2 3 A95

GO TO __*PAST HYPOMANIC EPISODE*__ A.23

NOTE: If elevated mood lasts less than 1 week, check whether irritable mood lasts at least 1 week before skipping to A.23.

NOTE: If there is evidence for more than one past episode, select the worst episode that occurred in the prior year; if none of the past episodes occurred in the prior year, select the worst episode that occurred regardless of the time it occurred.

FOCUS ON THE WORST PERIOD OF THE EPISODE THAT YOU ARE INQUIRING ABOUT.

IF UNCLEAR: **During** (EPISODE), **when were you the most** (**high/irritable**/OWN WORDS)**?**

B. During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms have persisted (four if the mood is only irritable) and have been present to a significant degree and represent a noticeable change from usual behavior:

During that time...

...how did you feel about yourself? (More self-confident than usual? Did you feel much smarter or better than everyone else? Did you feel like you had any special powers or abilities?)	1. Inflated self-esteem or grandiosity.	?	1	2	3	A96
...did you need less sleep than usual? (How much sleep did you get?) *IF YES*: **Did you still feel rested?**	2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep).	?	1	2	3	A97
...were you much more talkative than usual? (Did people have trouble stopping you or understanding you? Did people have trouble getting a word in edgewise?)	3. More talkative than usual or pressure to keep talking.	?	1	2	3	A98
...did you have thoughts racing through your head? (What was that like?)	4. Flight of ideas or subjective experience that thoughts are racing.	?	1	2	3	A99
...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)	5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli) as reported or observed.	?	1	2	3	A100
...how did you spend your time? (Work, friends, hobbies? Were you especially busy during that time?) **(Did you find yourself more enthusiastic at work or working harder at your job? Did you find yourself more engaged in school activities or studying harder?)** **(Were you more sociable during that time, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)** **(Were you spending more time thinking about sex or involved in doing something sexual, by yourself or with others? Was that a big change for you?)** **Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still? (How bad was it?)**	6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation (i.e., purposeless non-goal-directed activity). *Check if*: ___ increase in activity ___ psychomotor agitation	?	1	2	3	A101 A102 A103

During that time...

...did you do anything that could have caused trouble for you or your family?

(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)

(Anything sexual that was likely to get you in trouble? Driving recklessly?)

(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)

7. Excessive involvement in activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments)	?	1	2	3	A104

AT LEAST THREE "B" SXS ARE CODED "3" (FOUR IF MOOD ONLY IRRITABLE). [1] 3 A105

IF NOT ALREADY ASKED: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and had even more of the symptoms that I just asked you about?**

→ *IF YES*: *RETURN TO* ****PAST MANIC EPISODE**** *A.18, AND INQUIRE ABOUT WORST EPISODE.*

→ *IF NO*: *GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

CONTINUE ON NEXT PAGE

IF UNKNOWN: **What effect did these** (MANIC SXS) **have on your life?**

IF UNKNOWN: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION C.

How did (MANIC SXS) **affect your relationships or your interactions with other people? (Did** (MANIC SXS) **cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (MANIC SXS) **affect your work/school? (How about your attendance at work or school? Did** [MANIC SXS] **make it more difficult to do your work/schoolwork? How did** [MANIC SXS] **affect the quality of your work/schoolwork?)**

How did (MANIC SXS) **affect your ability to take care of things at home?**

C. The mood disturbance is sufficiently severe to cause marked impairment in social or occupational functioning or to necessitate hospitalization to prevent harm to self or others or there are psychotic features.

? 1 2 3 A106

CONTINUE ON NEXT PAGE

IF NOT ALREADY ASKED: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and had** (ACKNOWLEDGED MANIC SYMPTOMS) **and you got into trouble with people or were hospitalized?**

→ *IF YES: RETURN TO* ****PAST MANIC EPISODE**** *A.18, AND INQUIRE ABOUT OTHER EPISODE.*

→ *IF NO: GO TO* ****PAST HYPOMANIC CRITERION C**** *A.25*

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

D. [Primary Manic Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition.

? 1 3 A107

DUE TO SUBSTANCE USE OR GMC

PRIMARY MANIC EPISODE

IF THERE IS ANY INDICATION THAT THE MANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: A full Manic Episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a Manic Episode and, therefore a Bipolar I diagnosis.

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

CONTINUE WITH NEXT ITEM

IF UNKNOWN: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and were not** (**using** SUBSTANCE/ill with AMC)**?**

→ *IF YES: RETURN TO* ***PAST MANIC EPISODE*** *A.18, AND INQUIRE ABOUT OTHER EPISODE.*

→ *IF NO: GO TO* ***CURRENT CYCLOTHYMIC DISORDER*** *A.28.*

MANIC EPISODE CRITERIA A, B, C, AND D ARE CODED "3."

1 3 A108

PAST MANIC EPISODE

GO TO ***CURRENT CYCLOTHYMIC DISORDER***A.28

How old were you when (PAST MANIC EPISODE) **started?**

Age-at-onset of Past Manic Episode coded above

____ ____ A109

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

PAST HYPOMANIC EPISODE

When you were (**high/irritable**/OWN WORDS)**, did it last for at least 4 days? (Did it last for most of the day, nearly every day?)**

What was it like?

Have you had more than one time like that? (Which time was the most extreme?)

IF UNCLEAR: **Have you had any times like that in the past year, since** (1 YEAR AGO)**?**

FOCUS ON THE WORST PERIOD OF THE EPISODE THAT YOU ARE INQUIRING ABOUT.

IF UNCLEAR: **During** (EPISODE)**, when were you the most** (**high/irritable**/OWN WORDS FOR HYPOMANIA)**?**

During that time...

...how did you feel about yourself?

(More self-confident than usual? Did you feel much smarter or better than everyone else? Did you feel like you had any special powers or abilities?)

...did you need less sleep than usual? (How much sleep did you get?)

IF YES: **Did you still feel rested?**

...were you much more talkative than usual? (Did people have trouble stopping you or understanding you? Did people have trouble getting a word in edgewise?)

...did you have thoughts racing through your head? (What was that like?)

...were you so easily distracted by things around you that you had trouble concentrating or staying on one track? (Give me an example of that.)

HYPOMANIC EPISODE CRITERIA

A. A distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased activity or energy, lasting at least 4 consecutive days and persistent most of the day, nearly every day.

? 1 2 3 A110

GO TO ***CURRENT CYCLOTHYMIC DISORDER*** A.28

Check if:

___ elevated, expansive mood A111
___ irritable mood A112

NOTE: If there is evidence for more than one past episode, select the "worst" one for your inquiry about past Hypomanic Episode. If there was an episode in the past year, ask about that episode even if it was not the worst.

B. During the period of mood disturbance and increased energy and activity, 3 (or more) of the following symptoms (4 if the mood is only irritable) have persisted, represent a noticeable change from usual behavior, and have been present to a significant degree and represent a noticeable change from usual behavior:

1. Inflated self-esteem or grandiosity. ? 1 2 3 A113
2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep). ? 1 2 3 A114
3. More talkative than usual or pressure to keep talking. ? 1 2 3 A115
4. Flight of ideas or subjective experience that thoughts are racing. ? 1 2 3 A116
5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli), as reported or observed. ? 1 2 3 A117

During that time...

...how did you spend your time? (Work, friends, hobbies? Were you especially productive or busy during that time?)

(Did you find yourself more enthusiastic at work or working harder at your job? Did you find yourself more engaged in school activities or studying harder?)

(Were you more sociable during that time, such as calling on friends or going out with them more than you usually do or making a lot of new friends?)

(Were you spending more time thinking about sex or involved in doing something sexual, by yourself or with others? Was that a big change for you?)

Were you physically restless during this time, doing things like pacing a lot, or being unable to sit still? (How bad was it?)

6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation. ? 1 2 3 A118

Check if:

____ increase in activity A119
____ psychomotor agitation A120

...did you do anything that could have caused trouble for you or your family?

(Spending money on things you didn't need or couldn't afford? How about giving away money or valuable things? Gambling with money you couldn't afford to lose?)

(Anything sexual that was likely to get you in trouble? Driving recklessly?)

(Did you make any risky or impulsive business investments or get involved in a business scheme that you wouldn't normally have done?)

7. Excessive involvement in activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments) ? 1 2 3 A121

AT LEAST 3 "B" SXS ARE CODED "3" (4 IF MOOD ONLY IRRITABLE). 1 3 A122

NOTE: Because of the inherent difficulty in distinguishing normal periods of good mood from hypomania, review all items coded "3" in criterion B and recode any equivocal judgments.

CONTINUE WITH NEXT ITEM

*IF NO*T ALREADY ASKED: **Has there been any other time when you were (high/ irritable/**OWN WORDS**) and had even more of the symptoms that I just asked you about?**

- *IF YES: RETURN TO* ****PAST HYPOMANIC EPISODE**** *A.23 AND INQUIRE ABOUT THAT EPISODE.*
- *IF NO: GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

PAST HYPOMANIC CRITERION C

IF NOT KNOWN: **Was that very different from the way you usually are? (How were you different? At work? With friends?)**

C. The episode is associated with an unequivocal change in functioning that is uncharacteristic of the individual when not symptomatic. ? 1 2 3 A123

DESCRIBE:

CONTINUE ON NEXT PAGE

IF NOT ALREADY ASKED: **Have there been any other times when you were** (**high/ irritable/**OWN WORDS) **in which you were really different from the way you usually are?**

- *IF YES: RETURN TO* ****PAST HYPOMANIC EPISODE**** *A.23 AND INQUIRE ABOUT THAT EPISODE.*
- *IF NO: GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

IF NOT KNOWN: **Did other people notice the change in you? (What did they say?)**

D. The disturbance in mood and the change in functioning are observable by others.

? [1] 2 3 A124

DESCRIBE:

CONTINUE WITH NEXT ITEM

IF NOT ALREADY ASKED: **Have there been any other times when you were** (**high/irritable**/OWN WORDS) **and other people did notice the change in the way you were acting?**

→ *IF YES: RETURN TO* ****PAST HYPOMANIC EPISODE**** *A.23 AND INQUIRE ABOUT THAT EPISODE.*

→ *IF NO: GO TO* ****CURRENT CYCLOTHYMIC DISORDER**** *A.28.*

IF UNKNOWN: **What effect did these** (HYPOMANIC SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION:

How did (HYPOMANIC SXS) **affect your relationships or your interactions with other people? (Did they cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (HYPOMANIC SXS) **affect your work/school? (How about your attendance at work or school? Did** [HYPOMANIC SXS] **affect the quality of your work/schoolwork?)**

How did (HYPOMANIC SXS) **affect your ability to take care of things at home?**

IF UNKNOWN: **Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

E. The episode was not severe enough to cause marked impairment in social or occupational functioning or to necessitate hospitalization, and there are no psychotic features.

? 1 [2] 3 A125

SXS NOT SEVERE ENOUGH FOR A DX OF MANIC EPISODE

CONTINUE ON NEXT PAGE

IF SEVERE ENOUGH TO REQUIRE HOSPITALIZATION OR SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT AND DURATION WAS AT LEAST 1 WEEK, CHECK HERE ___ AND GO TO A.19 AND TRANSCRIBE CRITERION B SYMPTOM RATINGS AND CONTINUE WITH RATINGS FOR PAST MANIC EPISODE. A126

IF SEVERE ENOUGH TO CAUSE MARKED IMPAIRMENT BUT LASTED LESS THAN 1 WEEK, CHECK HERE ___ AND GO TO ***CURRENT CYCLOTHYMIC DISORDER*** A.28. IF CRITERIA ARE NOT MET FOR A PAST MANIC EPISODE, CODE "OTHER BIPOLAR DISORDER" FOR THIS SEVERE BUT BRIEF EPISODE, AND INDICATE "TYPE 5" ON D.8. A127

IF UNKNOWN: **When did this period of being** (**high/irritable**/OWN WORDS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you taking any medications?

IF YES: **Any change in the amount you were taking?**

Just before this began, were you drinking or using any drugs?

F. [Primary Hypomanic Episode:] The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition.

IF THERE IS ANY INDICATION THAT THE HYPOMANIA MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE*** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: A full hypomanic episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a hypomanic episode diagnosis. However, caution is indicated so that one or two symptoms (particularly increased irritability, edginess, or agitation following antidepressant use) are neither taken as sufficient for diagnosis of a hypomanic episode, nor necessarily indicative of a bipolar diathesis.

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

? 1 3 A128

DUE TO SUBSTANCE USE OR GMC

PRIMARY HYPOMANIC EPISODE

IF UNKNOWN: **Has there been any other time when you were** (**high/irritable**/OWN WORDS) **and were not** (**using** SUBSTANCE/ MEDICATION/**ill with AMC**)**?**

→ *IF YES: RETURN TO* ***PAST HYPOMANIC EPISODE*** *A.23 AND INQUIRE ABOUT ANOTHER EPISODE.*

→ *IF NO: GO TO* ***CURRENT CYCLOTHYMIC DISORDER*** *A.28.*

CONTINUE WITH NEXT ITEM

HYPOMANIC EPISODE CRITERIA A, B, C, D, E, AND F ARE CODED "3."

1 3 A129

GO TO ***CURRENT CYCLOTHYMIC DISORDER*** A.28

PAST HYPOMANIC EPISODE

How old were you when (PAST HYPOMANIC EPISODE) **started?**

Age at onset of Past Hypomanic Episode coded above. ____ ____ A130

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

CURRENT CYCLOTHYMIC DISORDER

CURRENT CYCLOTHYMIC DISORDER CRITERIA

*IF THERE HAS EVER BEEN A MAJOR DEPRESSIVE, MANIC, OR HYPOMANIC EPISODE, CHECK HERE ___ AND GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER**** *A.30.* A131

For the past couple of years, since (2 YEARS AGO)**, have you had lots of times in which you were feeling high, excited or irritable as well as lots of time in which you were feeling down or depressed?**

IF YES: **Tell me about that.**

A. For at least 2 years (1 year for children or adolescents), there have been numerous periods with hypomanic symptoms that do not meet criteria for hypomanic episodes and numerous periods of depressed mood or loss of interest that did not meet criteria for a Major Depressive Episode. ? 1 2 3 A132

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

Were you like this for most of the time since (2 YEARS AGO)**?**

IF YES: **Since** (2 YEARS AGO)**, what is the longest period of time in which you felt OK, that is, neither high, irritable, down, nor depressed?**

B. During the above 2-year period (1 year in children or adolescents), the hypomanic and depressive periods have been present for at least half the time and the individual has not been without the symptoms for more than 2 months at a time. ? 1 2 3 A133

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

C. Criteria for a Major Depressive Episode, Manic, or Hypomanic Episode have never been met. ? 1 2 3 A134

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

IF NOT ALREADY CLEAR: RETURN TO THIS ITEM AFTER COMPLETING THE PSYCHOTIC DISORDERS SECTION.

D. The symptoms in Criterion A are not better explained by Schizoaffective Disorder, Schizophrenia, Schizophreniform Disorder, Delusional Disorder, or Other Specified or Unspecified Schizophrenia Spectrum and Other Psychotic Disorder. ? 1 2 3 A135

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

IF UNKNOWN: **When did this begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

E. [Primary Cyclothymia.] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition. ? 1 3 A136

IF THERE IS ANY INDICATION THAT THE HYPOMANIC AND DEPRESSIVE SXS MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE/MEDICATION**** A.41, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.13.

→ PRIMARY CYCLOTHYMIA

→ DUE TO SUBSTANCE USE OR AMC; GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

→ CONTINUE ON NEXT PAGE

IF UNKNOWN: **What effect have the mood swings had on your life? (For example, when you are feeling good, do you take things on but then not follow through when you get depressed?)**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION F:

How have mood swings affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)

How have the mood swings affected your work/school? (How about your attendance at work or school? Did they make it more difficult to do your work/schoolwork? How have the mood swings affected the quality of your work/schoolwork?)

How have the mood swings affected your ability to take care of things at home?

Have the mood swings affected any other important part of your life?

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by having mood swings ?**

F. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A137

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

CYCLOTHYMIC DISORDER CRITERIA A, B, C, D, E, AND F ARE CODED "3."

1 3 A138

→ GO TO ***CURRENT PERSISTENT DEPRESSIVE DISORDER*** A.30

→ CURRENT CYCLOTHYMIC DISORDER

WITH ANXIOUS DISTRESS

ANXIOUS DISTRESS SPECIFIER CRITERIA

On most of the days when you were feeling depressed, high, excited, or irritable, were you also…

At least two of the following symptoms during the majority of days of the Cyclothymic Disorder:

…feeling keyed up or tense? (On most of the days?)	1. Feeling keyed up or on edge.	?	1	2	3	AS104
…feeling unusually restless? (On most of the days?)	2. Feeling unusually restless.	?	1	2	3	AS105
…having trouble concentrating because you were worrying about things? (On most of the days?)	3. Difficulty concentrating because of worry.	?	1	2	3	AS106
…afraid that something awful was going to happen? (On most of the days?)	4. Fear that something awful may happen.	?	1	2	3	AS107
…feeling that your anxiety or worry would be out of control? (On most of the days?)	5. Feeling that the individual might lose control of [his or her anxiety or worry].	?	1	2	3	AS108

AT LEAST TWO ITEMS ARE CODED "3." 1 3 AS109

- 1 → CONTINUE ON NEXT PAGE
- 3 → WITH ANXIOUS DISTRESS; INDICATE CURRENT SEVERITY

*Indicate **current severity***: (circle the appropriate number)

IF FOUR OR FIVE SYMPTOMS ARE CODED "3": **On those days on which you were feeling anxious, were you also pacing, moving around a lot or unable to sit still?** AS110

1 – **Mild:** Two symptoms

2 – **Moderate:** Three symptoms

3 – **Moderate-Severe:** Four or five symptoms [without motor agitation]

4 – **Severe:** Four or five symptoms and with motor agitation

CURRENT PERSISTENT DEPRESSIVE DISORDER

CURRENT PERSISTENT DEPRESSIVE DISORDER CRITERIA

*IF THERE HAS EVER BEEN A MANIC OR HYPOMANIC EPISODE, CHECK HERE ___ AND GO TO ***PREMENSTRUAL DYSPHORIC DISORDER**** *A.36.* A139

Since (2 YEARS AGO)**, have you been bothered by depressed mood most of the day, more days than not? (More than half of the time?)**

IF YES: **What has that been like?**

A. Depressed mood for most of the day, for more days than not, as indicated either by subjective account or observation by others, for at least 2 years. NOTE: in adolescents, mood can be irritable and duration must be at least 1 year.

? 1 2 3 A140

GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

During these periods of (OWN WORDS FOR CHRONIC DEPRESSION) **did you often...**

B. Presence, while depressed, of two (or more) of the following:

...lose your appetite? (What about overeating?)

1. Poor appetite or overeating. ? 1 2 3 A141

...have trouble sleeping or sleep too much?

2. Insomnia or hypersomnia. ? 1 2 3 A142

...have little energy to do things or feel tired a lot?

3. Low energy or fatigue. ? 1 2 3 A143

...feel down on yourself? (Feel worthless, or a failure?)

4. Low self-esteem. ? 1 2 3 A144

...have trouble concentrating or making decisions?

5. Poor concentration or difficulty making decisions. ? 1 2 3 A145

...feel hopeless?

6. Feelings of hopelessness. ? 1 2 3 A146

AT LEAST TWO "B" SYMPTOMS ARE CODED "3." ? 1 2 3 A147

GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

Since (2 YEARS AGO), **what was the longest period of time that you felt OK** (NO DYSTHYMIC SYMPTOMS)**?**

C. During the 2-year period (1 year for children or adolescents) of the disturbance, the individual has never been without the symptoms in Criteria A and B for more than 2 months at a time.

NOTE: Code "1" if normal mood for more than 2 months at a time.

1 3 A148

GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

E. There has never been a Manic Episode or a Hypomanic Episode, and criteria have never been met for Cyclothymic disorder.

1 3 A149

GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

IF NOT ALREADY CLEAR, RETURN TO THIS ITEM AFTER COMPLETING THE PSYCHOTIC DISORDERS SECTION.

F. The disturbance is not better explained by a persistent Schizoaffective Disorder, Schizophrenia, Delusional Disorder, or Other Specified or Unspecified Schizophrenia Spectrum or Other Psychotic Disorder.

1 3 A150

GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

NOTE: Code "3" if *NO* chronic psychotic disorder has been present or if *NOT* better explained by a chronic psychotic disorder.

IF UNKNOWN: **When did this begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

G. [Primary Persistent Depressive Disorder:] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition (e.g., hypothyroidism).

? 1 3 A151

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE/MEDICATION*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

DUE TO SUBSTANCE USE OR GMC, GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

PRIMARY DEPRESSIVE DISORDER

CONTINUE WITH NEXT ITEM

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.

IF UNKNOWN: **What effect have these** (DEPRESSIVE SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION H:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Has it caused you any problems in your relationships with your family, romantic partner or friends?)**

How have these (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Have** [DEPRESSIVE SXS] **made it more difficult to do your work/schoolwork? How did** [DEPRESSIVE SXS] **affect the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

H. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A152

Have these (DEPRESSIVE SXS) **affected any other important part of your life?**

IF DOES NOT INTERFERE WITH LIFE: How much you been bothered or upset by having (DEPRESSIVE SXS)**?**

PERSISTENT DEPRESSIVE DISORDER CRITERIA A, B, C, D, E, F, G, AND H ARE CODED "3."

1 → GO TO ***PAST PERSISTENT DEPRESSIVE DISORDER*** A.33

3 → CURRENT PERSISTENT DEPRESSIVE DISORDER A153

*Indicate **onset** specifier*:
1 – **Early onset**: onset before age 21
2 – **Late onset**: onset age 21 or older A154

Specify if (for most recent 2 years of Persistent Depressive Disorder): A155

NOTE: Additional information about onset and offset of Major Depressive Episodes during the past 2 years may be needed to evaluate this specifier.

___ **With pure dysthymic syndrome**: Full criteria for a Major Depressive Episode have not been met in at least the preceding 2 years.

___ **With persistent Major Depressive Episode**: Full criteria for a Major Depressive Episode have been met throughout the preceding 2-year period.

___ **With intermittent Major Depressive Episodes, with current episode:** Full criteria for a Major Depressive Episode are currently met, but there have been periods of at least 8 weeks in at least the preceding 2 years with symptoms below the threshold for a full Major Depressive Episode.

___ **With intermittent Major Depressive Episodes, without current episode:** Full criteria for a Major Depressive Episode are not currently met, but there has been one or more Major Depressive Episodes in at least the preceding 2 years.

Specify if: A156

IF UNKNOWN: **Have there been any panic attacks in the past month?**

___ **With panic attacks**: if one or more panic attacks in the past month occurred in the context of current Persistent Depressive Disorder (see page F.7) and criteria have never been met for Panic Disorder.

WITH ANXIOUS DISTRESS

ANXIOUS DISTRESS SPECIFIER CRITERIA

On most of the days when you were feeling depressed, did you also...

At least two of the following symptoms during the majority of days of the Persistent Depressive Disorder:

...feel keyed up or tense? (On most of the days?)	1. Feeling keyed up or on edge.	?	1	2	3	AS111
...feel unusually restless? (On most of the days?)	2. Feeling unusually restless.	?	1	2	3	AS112
...have trouble concentrating because you were worrying about things? (On most of the days?)	3. Difficulty concentrating because of worry.	?	1	2	3	AS113
...feel afraid that something awful was going to happen? (On most of the days?)	4. Fear that something awful may happen.	?	1	2	3	AS114
...feel that your anxiety or worry would be out of control? (On most of the days?)	5. Feeling that the individual might lose control [of his or her anxiety or worry].	?	1	2	3	AS115
	AT LEAST TWO ITEMS ARE CODED "3."		1		3	AS116

IF FOUR OR FIVE SYMPTOMS CODED "3": **On those days on which you were feeling anxious, were you also pacing, moving around a lot or unable to sit still?**

*Indicate **current severity*** (circle the appropriate number):

1 – **Mild:** Two symptoms

2 – **Moderate:** Three symptoms

3 – **Moderate-Severe:** Four or five symptoms [without motor agitation]

4 – **Severity:** Four or five symptoms and with motor agitation

CONTINUE WITH ***ATYPICAL FEATURES*** BELOW

WITH ANXIOUS DISTRESS; INDICATE CURRENT SEVERITY

AS117

ATYPICAL FEATURES SPECIFIER

WITH ATYPICAL FEATURES

On most of the days when you were feeling depressed...

The following criteria must be present during the majority of days of the Persistent Depressive Disorder:

If something good happened to you or someone tried to cheer you up, did you feel better, at least for a while?	A. Mood reactivity (i.e., mood brightens in response to actual or potential positive events).	?	1	2	3	AS118

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

On most of the days that you were feeling depressed...

B. Two (or more) of the following features:

IF UNKNOWN: **Did your appetite increase a lot or did you gain a lot of weight? (On most of the days?)**	1. Significant weight gain or increase in appetite.	?	1	2	3	AS119
How many hours (in a 24-hour period) did you usually sleep (including naps) on days when you were feeling depressed? (On most of the days?)	2. Hypersomnia. NOTE: Code "3" if more than 10 hours a day or if at least 2 hours more than when not depressed.	?	1	2	3	AS120

On most of the days when you were feeling depressed...

Did your arms or legs often feel heavy (as though they were full of lead)? (On most of the days?)

3. Leaden paralysis (i.e., heavy, leaden feelings in arms or legs). ? 1 2 3 AS121

...were you especially sensitive to how others treated you?

...what happened to you when someone rejected, criticized, or slighted you (on days that you were feeling depressed)? (Do you get very down or angry? For how long? How did this affect you? Was your reaction more extreme than most people's? Did you avoid doing things or being with people because you were afraid of being criticized or rejected? On most of the days?)

4. A long-standing pattern of interpersonal rejection sensitivity (not limited to episodes of mood disturbance) that results in significant social or occupational impairment. ? 1 2 3 AS122

AT LEAST TWO "B" CRITERIA ARE CODED "3." 1 3 AS123

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

CRITERIA "A" AND "B" ARE CODED "3." 1 3 AS124

→ WITH ATYPICAL FEATURES

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

PAST PERSISTENT DEPRESSIVE DISORDER

PAST PERSISTENT DEPRESSIVE DISORDER CRITERIA

IF NO CURRENT TWO YEAR PERIOD OF DEPRESSED MOOD: **Have you ever had a period of time, lasting for at least 2 years, when you have been bothered by depressed mood most of the day, more days than not? (More than half of the time?)**

IF YES: **What was that like?**

A. Depressed mood for most of the day, for more days than not, as indicated either by subjective account or observation by others, for at least 2 years. NOTE: in adolescents, mood can be irritable and duration must be at least 1 year.

? 1 2 3 A157

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

IF CURRENT TWO YEAR PERIOD OF DEPRESSED MOOD: **Prior to the past two years, have you ever had a period of time, lasting for at least 2 years, when you have been bothered by depressed mood most of the day, more days than not? (More than half of the time?)**

IF YES: **What was that like?**

During these periods of (OWN WORDS FOR CHRONIC DEPRESSION) **did you often...**

B. Presence, while depressed, of two (or more) of the following:

...lose your appetite? (What about overeating?)

1. Poor appetite or overeating. ? 1 2 3 A158

...have trouble sleeping or slept too much?

2. Insomnia or hypersomnia. ? 1 2 3 A159

...have little energy to do things or feel tired a lot?

3. Low energy or fatigue. ? 1 2 3 A160

...feel down on yourself? (Feel worthless, or a failure?)

4. Low self-esteem. ? 1 2 3 A161

...have trouble concentrating or making decisions?

5. Poor concentration or difficulty making decisions. ? 1 2 3 A162

...feel hopeless?

6. Feelings of hopelessness. ? 1 2 3 A163

AT LEAST TWO "B" SYMPTOMS ARE CODED "3." ? 1 2 3 A164

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

What was the longest period of time during this period of long-lasting depression, that you felt OK (NO DYSTHYMIC SYMPTOMS)?

C. During the 2-year period (1 year for children or adolescents) of the disturbance, the individual has never been without the symptoms in Criteria A and B for more than 2 months at a time.

NOTE: Code "1" if normal mood for more than 2 months at a time.

1 3 A165

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

E. There has never been a Manic Episode or a Hypomanic Episode, and criteria have never been met for Cyclothymic disorder.

1 3 A166

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

IF NOT ALREADY CLEAR: RETURN TO THIS ITEM AFTER COMPLETING THE PSYCHOTIC DISORDERS SECTION.

F. The disturbance is not better explained by a Persistent Schizoaffective Disorder, Schizophrenia, Delusional Disorder, or Other Specified or Unspecified Schizophrenia Spectrum or Other Psychotic Disorder.

NOTE: Code "3" if NO chronic psychotic disorder has been present or if NOT better explained by a chronic psychotic disorder.

1 3 A167

GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

IF UNKNOWN: **When did this begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

Just before this began, were you drinking or using any drugs?

G. [Primary Persistent Depressive Disorder:] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, medication) or to another medical condition (e.g., hypothyroidism).

IF THERE IS ANY INDICATION THAT THE DEPRESSION MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE/MEDICATION*** A.45 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.

? 1 3 A168

PRIMARY DEPRESSIVE DISORDER

DUE TO SUBSTANCE USE OR GMC; GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

CONTINUE ON NEXT PAGE

IF UNKNOWN: **What effect did these** (DEPRESSIVE SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION H:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Have** (DEPRESSIVE SXS) **caused you any problems in your relationships with your family, romantic partner or friends?)**

How have these (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Did** [DEPRESSIVE SXS] **make it more difficult to do your work/schoolwork? How did** [DEPRESSIVE SXS] **affect the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have these (DEPRESSIVE SXS) **affected any other important part of your life?**

IF DID NOT INTERFERE WITH LIFE: **How much have you been bothered or upset by having** (DEPRESSIVE SXS)**?**

H. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. ? 1 2 3 A169

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

PERSISTENT DEPRESSIVE DISORDER CRITERIA A, B, C, D, E, F, G, AND H ARE CODED "3." 1 3 A170

→ GO TO ***PREMENSTRUAL DYSPHORIC DISORDER*** A.36

→ PAST PERSISTENT DEPRESSIVE DISORDER

*Indicate **onset** specifier*: (circle the appropriate number) A171
1 – **Early onset**: onset before age 21
2 – **Late onset**: onset age 21 or

PREMENSTRUAL DYSPHORIC DISORDER (PAST 12 MONTHS)

PREMENSTRUAL DYSPHORIC DISORDER CRITERIA

IF SUBJECT IS A BIOLOGICAL MALE, POST-MENOPAUSAL FEMALE, PREGNANT FEMALE, OR FEMALE WITH HYSTERECTOMY PLUS OOPHORECTOMY, CHECK HERE ___ AND SKIP TO NEXT MODULE. A172

Looking back over your menstrual cycles for the past 12 months, since (1 YEAR AGO)**, have you had mood symptoms such as anger, irritability, anxiety, or depression that developed before your period and then went away during the week after your period?**

IF YES: **After your period began, did the problems disappear for at least a week?**

For how many days during a cycle did you have symptoms?

Since (1 YEAR AGO)**, did this happen for most of your cycles?**

A. In the majority of menstrual cycles, at least five symptoms must be present in the final week before the onset of menses, start to improve within a few days after the onset of menses, and become minimal or absent in the week postmenses.

? 1 2 3 A173

GO TO NEXT MODULE

NOTE: If number of days of symptoms is 20 per month or greater, recheck symptom-free and symptom present intervals.

Think of the most severe premenstrual time you experienced since (1 YEAR AGO)**. Tell me about that time.**

Now I'm going to ask you some specific questions about that premenstrual time.

B. One (or more) of the following symptoms must be present:

...did you have mood swings in which you would feel suddenly sad or tearful?

IF NO: **How about getting unusually upset if someone criticized or rejected you?**

IF YES TO EITHER: **Did this go away when your menstrual period began or shortly after?**

1. Marked affective liability (e.g., mood swings; feeling suddenly sad or tearful, or increased sensitivity to rejection). ? 1 2 3 A174

...were you especially irritable or angry?

IF NO: **How about getting into a lot of fights or arguments with other people?**

IF YES TO EITHER: **Did this go away when your menstrual period began or shortly after?**

2. Marked irritability or anger or increased interpersonal conflicts. ? 1 2 3 A175

...did you feel very sad, down, depressed, or hopeless? *IF NO*: **How about feeling especially critical of yourself or that everything you did was wrong?** *IF YES TO EITHER:* **Did this go away when your menstrual period began or shortly after?**	3. Marked depressed mood, feelings of hopelessness, or self-deprecating thoughts.	?	1	2	3	A176
...did you feel extremely anxious or tense or like you were keyed up or on edge? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	4. Marked anxiety, tension, and/or feelings of being keyed up or on edge.	?	1	2	3	A177
	AT LEAST ONE "B" SYMPTOM IS CODED "3"		1		3	A178
			GO TO NEXT MODULE			
Now I'm going to ask you about some other experiences that sometimes go along with these mood symptoms.	C. One (or more) of the following symptoms must additionally be present, to reach a total of five symptoms when combined with symptoms from Criterion B above.					
...did you lose interest in work or school, going out with friends, or in your hobbies? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	1. Decreased interest in usual activities (e.g., work, school, friends, and hobbies).	?	1	2	3	A179
...did you find it hard to concentrate on things? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	2. Subjective difficulty in concentration.	?	1	2	3	A180
...did you feel like your energy was very low or that you got tired very easily? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	3. Lethargy, easy fatigability, or marked lack of energy.	?	1	2	3	A181
...was your appetite increased? Did you have specific food cravings, like for chocolate or fried foods? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	4. Marked change in appetite; overeating; or specific food cravings.	?	1	2	3	A182

...were you sleeping more than is usual for you or have difficulty sleeping? (How much sleep were you getting during that time?) *IF YES*: **Did this go away when your menstrual period began or shortly after?**	5. Hypersomnia or insomnia.	?	1	2	3	A183
...were you feeling overwhelmed by everything or like your life was out of control? *IF YES*: **Did this go away when your menstrual period began or shortly after?**	6. A sense of being overwhelmed or out of control.	?	1	2	3	A184
...did you have physical symptoms like breast tenderness or swelling, joint or muscle pain, or feeling bloated? Did you gain weight? *IF YES*: **Did these symptoms go away when your menstrual period began or shortly after?**	7. Physical symptoms such as breast tenderness or swelling, joint or muscle pain, a sensation of "bloating," or weight gain.	?	1	2	3	A185
	AT LEAST ONE "C" SYMPTOM IS CODED "3."		1		3	A186
			GO TO NEXT MODULE			
	AT LEAST FIVE "B" AND "C" SYMPTOMS ARE CODED "3."		1		3	A187
			GO TO NEXT MODULE			
IF UNCLEAR: **Has this happened for most of your cycles in the past year?**	Symptoms in criterion A-C must have been met for most menstrual cycles in the preceding year. NOTE: Code "3" only if symptoms in criteria A-C have been met for 7 or more cycles in the past year.	?	1	2	3	A188
			GO TO NEXT MODULE			

***IF UNKNOWN*: What effect have** (PMDD SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION D:

How have (PMDD SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (PMDD SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have (PMDD SXS) **affected your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have (PMDD SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by having** (PMDD SXS)**?**

D. The symptoms are associated with clinically significant distress or interference with work, school, usual social activities, or relationships with others (e.g., avoidance of social activities; decreased productivity and efficiency at work, school, or home).

? 1 2 3 A188

GO TO NEXT MODULE

IF HISTORY OF ANOTHER MENTAL DISORDER AND UNKNOWN: **Are these symptoms different from the symptoms you had from** (PAST DISORDER)**? Or is it just those same symptoms getting worse just before your period?**

E. The disturbance is not merely an exacerbation of the symptoms of another disorder, such as Major Depressive Disorder, Panic Disorder, Persistent Depressive Disorder (Dysthymia), or a personality disorder (although it may co-occur with any of these disorders).

? 1 2 3 A190

GO TO NEXT MODULE

Since (1 YEAR AGO)**, when you were having these symptoms, were you physically ill?**

IF YES: **What did the doctor say?**

Since (1 YEAR AGO), **have you been taking any medications?**

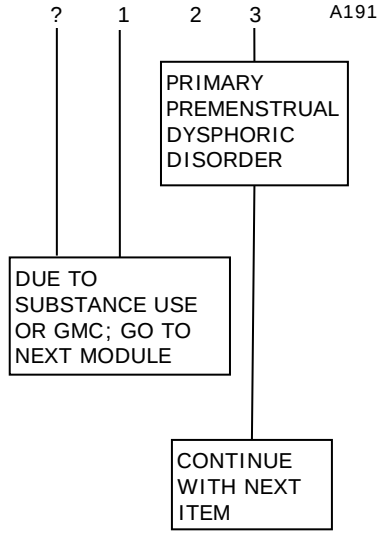
IF YES: **Any change in the amount you were taking?**

Since (1 YEAR AGO)**, have you been drinking or using any drugs?**

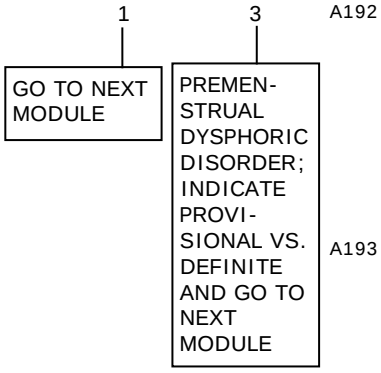
G. [Primary Premenstrual Dysphoric Disorder:] The symptoms are not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication, other treatment) or another medical condition (e.g., hyperthyroidism).

IF THERE IS ANY INDICATION THAT THE SYMPTOMS MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** A.45, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to lists of etiological medical conditions and substances/medications on page A.4.



PMDD CRITERIA A, B, C, D, E, AND G ARE CODED "3."



IF UNKNOWN: **Have you ever kept a diary of your symptoms and how they relate to your cycles?**

*Indicate **provisional** vs. **definite** diagnosis*: (circle the appropriate number)

1 - **Provisional dx:** The symptom pattern in Criterion A has NOT been confirmed by prospective daily ratings during at least two symptomatic cycles.

2 - **Definite dx:** Criterion F is present, i.e., the symptom pattern in Criterion A (i.e., at least five symptoms must be present in the final week before the onset of menses, start to improve within a few days after the onset of menses, and become minimal or absent in the week postmenses) has been confirmed by prospective daily ratings during at least two symptomatic cycles.

GMC/SUBSTANCE CAUSING BIPOLAR AND RELATED SYMPTOMS

BIPOLAR AND RELATED DISORDER DUE TO ANOTHER MEDICAL CONDITION

BIPOLAR AND RELATED DISORDER DUE TO ANOTHER MEDICAL CONDITION CRITERIA

*IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH A GENERAL MEDICAL CONDITION, CHECK HERE ___ AND GO TO ***SUBSTANCE-INDUCED BIPOLAR AND RELATED DISORDER*** A.43.* A194

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent period of abnormally elevated, expansive, or irritable mood and abnormally increased activity or energy that predominates in the clinical picture. ? 1 2 3 A195

B/C. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of another medical condition and the disturbance is not better accounted for by another mental disorder. ? 1 3 A196

GO TO ***SUBSTANCE-INDUCED*** A.43

Did the (BIPOLAR SXS) **change after** (GMC) **began? Did** (BIPOLAR SXS) **start or get much worse only after** (GMC) **began? How long after** (GMC) **began did** (BIPOLAR SXS) **start or get much worse?**

*IF GMC HAS RESOLVED***: Did the** (BIPOLAR SXS) **get better once the** (GMC) **got better?**

NOTE: The following factors should be considered and, if present, support the conclusion that a general medical condition is etiologic to the bipolar symptoms.

1) There is evidence from the literature of a well-established association between the general medical condition and the bipolar symptoms. (Refer to list of etiological medical conditions on page A.13.)

2) There is a close temporal relationship between the course of the bipolar symptoms and the course of the general medical condition.

3) The bipolar symptoms are characterized by unusual presenting features (e.g., late age-at-onset).

4) The absence of alternative explanations (e.g., bipolar symptoms as a psychological reaction to the stress of being diagnosed with a general medical condition).

IF UNKNOWN: **What effect have** (BIPOLAR SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (BIPOLAR SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have they affected your work/ school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)

How did (BIPOLAR SXS) **affect your ability to take care of things at home? Did you need to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

Have (BIPOLAR SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have** (BIPOLAR SXS) **bothered or upset you?**

E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or necessitates hospitalization to prevent harm to self or others, or there are psychotic features.

? 1 2 3 A197

GO TO ***SUBSTANCE-INDUCED*** A.43

NOTE: The D criterion (delirium rule-out) has been omitted.

BIPOLAR DISORDER DUE TO AMC CRITERIA A, B/C, AND E ARE CODED "3."

1 3 A198

BIPOLAR DISORDER DUE TO AMC

Check here ___ if current in the past month A199

Specify if:

1 - With manic features: Full criteria are not met for a manic or hypomanic episode.

2 - With manic- or hypomanic-like episode: Full criteria are met except Criterion D for a manic episode or except Criterion F for a hypomanic episode.

3 - With mixed features: Symptoms of depression are also present but do not predominate in the clinical picture. A200

CONTINUE ON NEXT PAGE

SUBSTANCE-/MEDICATION-INDUCED BIPOLAR DISORDER

SUBSTANCE-/MEDICATION-INDUCED BIPOLAR DISORDER CRITERIA

IF SYMPTOMS ARE NOT TEMPORALLY ASSOCIATED WITH SUBSTANCE/MEDICATION USE, CHECK HERE ___ AND RETURN TO EPISODE BEING EVALUATED, CONTINUING WITH THE ITEM FOLLOWING "SYMPTOMS ARE NOT ATTRIBUTABLE TO THE PHYSIOLOGICAL EFFECTS OF A SUBSTANCE OR ANOTHER MEDICAL CONDITION" (SEE PAGE NUMBERS IN BOX TO THE RIGHT).

PAGE TO RETURN TO IN EPISODE BEING EVALUATED:	
Current Manic	A.13
Current Hypomanic	A.17
Past Manic	A.22
Past Hypomanic	A.27
Current Cyclothymic Disorder	A.28
Other Specified Bipolar	D.7

A201

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent disturbance in mood that predominates in the clinical picture and is characterized by elevated, expansive, or irritable mood, with or without depressed mood, or markedly diminished interest or pleasure in all, or almost all activities.

? 1 2 3 A202

IF UNKNOWN: **When did the** (BIPOLAR SXS) **begin? Were you already using** (SUBSTANCE/MEDICATION) **or had you just stopped or cut down your use?**

IF UNKNOWN: **How much** (SUBSTANCE/MEDICATION) **were you using when you began to have** (BIPOLAR SXS)**?**

B. There is evidence from the history, physical examination, or laboratory findings of both (1) and (2):

1. The symptoms in criterion A developed during or soon after substance intoxication or withdrawal or exposure to a medication.

2. The involved substance/medication is capable of producing the symptoms in Criterion A. NOTE: Refer to list of etiological substances/medications on page A.13.

? 1 2 3 A203

NOT SUBSTANCE-INDUCED. RETURN TO EPISODE BEING EVALUATED

ASK ANY OF THE FOLLOWING QUESTIONS AS NEEDED TO RULE OUT A NON-SUBSTANCE-INDUCED ETIOLOGY.

IF UNKNOWN: **Which came first, the** (SUBSTANCE/MEDICATION USE) **or the** (BIPOLAR SXS)**?**

IF UNKNOWN: **Have you had a period of time when you stopped using** (SUBSTANCE/MEDICATION)**?**

IF YES: **After you stopped using** (SUBSTANCE/MEDICATION) **did the** (BIPOLAR SXS) **go away or get better?**

IF YES: **How long did it take for them to get better? Did they go away within a month of stopping?**

IF UNKNOWN: **Have you had any other episodes of** (BIPOLAR SXS)**?**

IF YES: **How many? Were you using** (SUBSTANCE/MEDICATION) **at those times?**

C. The disturbance is NOT better accounted for by a bipolar or related disorder that is not substance-induced. Such evidence of an independent bipolar or related disorder could include the following:

NOTE: The following three statements constitute evidence that the bipolar symptoms are not substance-induced. Code "1" if any are true. Code "3" only if *none* are true.

1) The symptoms precede the onset of the substance/medication use;
2) The symptoms persist for a substantial period of time (e.g., about 1 month) after the cessation of acute withdrawal or severe intoxication; or
3) There is other evidence suggesting the existence of an independent non-substance/medication-induced bipolar and related disorder (e.g., a history of recurrent non-substance/medication-related episodes).

? 1 3 A204

RETURN TO EPISODE BEING EVALUATED

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

IF UNKNOWN: **What effect have** (BIPOLAR SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (BIPOLAR SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner, or friends?)**

How have (BIPOLAR SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How did (BIPOLAR SXS) **affect your ability to take care of things at home? Have you needed to go into the hospital to protect you from hurting yourself or someone else, or from doing something that could have caused serious financial or legal problems?**

Have (BIPOLAR SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have** (BIPOLAR SX) **bothered or upset you?**

E. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A205

RETURN TO EPISODE BEING EVALUATED

NOTE: The D criterion (delirium rule-out) has been omitted.

SUBSTANCE-INDUCED BIPOLAR DISORDER CRITERIA A, B, C, AND E ARE CODED "3."

1 3 A206

SUBSTANCE-/ MEDICATION-INDUCED BIPOLAR DISORDER

Check here ___ if current in the past month. A207

*Indicate **context of development** of mood symptoms*: A208

1 – **With onset during intoxication**

2 – **With onset during withdrawal**

RETURN TO EPISODE BEING EVALUATED

GMC/SUBSTANCE CAUSING DEPRESSIVE SYMPTOMS

DEPRESSIVE DISORDER DUE TO ANOTHER MEDICAL CONDITION

DEPRESSIVE DISORDER DUE TO ANOTHER MEDICAL CONDITION CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH A GENERAL MEDICAL CONDITION, CHECK HERE ___ AND GO TO ****SUBSTANCE-INDUCED DEPRESSIVE DISORDER**** *A.48* A209

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent period of depressed mood or markedly diminished interest or pleasure in all, or almost all, activities that predominates in the clinical picture. ? 1 2 3 A210

B./C. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of another medical condition and the disturbance is not better accounted for by another mental disorder. ? 1 3 A211

→ GO TO ***SUBSTANCE-INDUCED*** A.48

Did the (DEPRESSIVE SXS) **change after** (GMC) **began? Did** (DEPRESSIVE SXS) **start or get much worse only after** (GMC) **began? How long after** (GMC) **began did** (DEPRESSIVE SXS) **start or get much worse?**

*IF GMC HAS RESOLVED***: Did the** (DEPRESSIVE SXS) **get better once the** (GMC) **got better?**

NOTE: The following factors should be considered and, if present, support the conclusion that a general medical condition is etiologic to the depressive symptoms.

1) There is evidence from the literature of a well-established association between the general medical condition and the depressive symptoms. (Refer to list of etiological general medical conditions on page A.4.)

2) There is a close temporal relationship between the course of the depressive symptoms and the course of the general medical condition.

3) The depressive symptoms are characterized by unusual presenting features (e.g., late age-at-onset).

4) The absence of alternative explanations (e.g., depressive symptoms as a psychological reaction to the stress of being diagnosed with a general medical condition).

IF UNKNOWN: **What effect have** (DEPRESSIVE SX) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner, or friends?)**

How have (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have (DEPRESSIVE SXS) **affected any other important part of your life?**

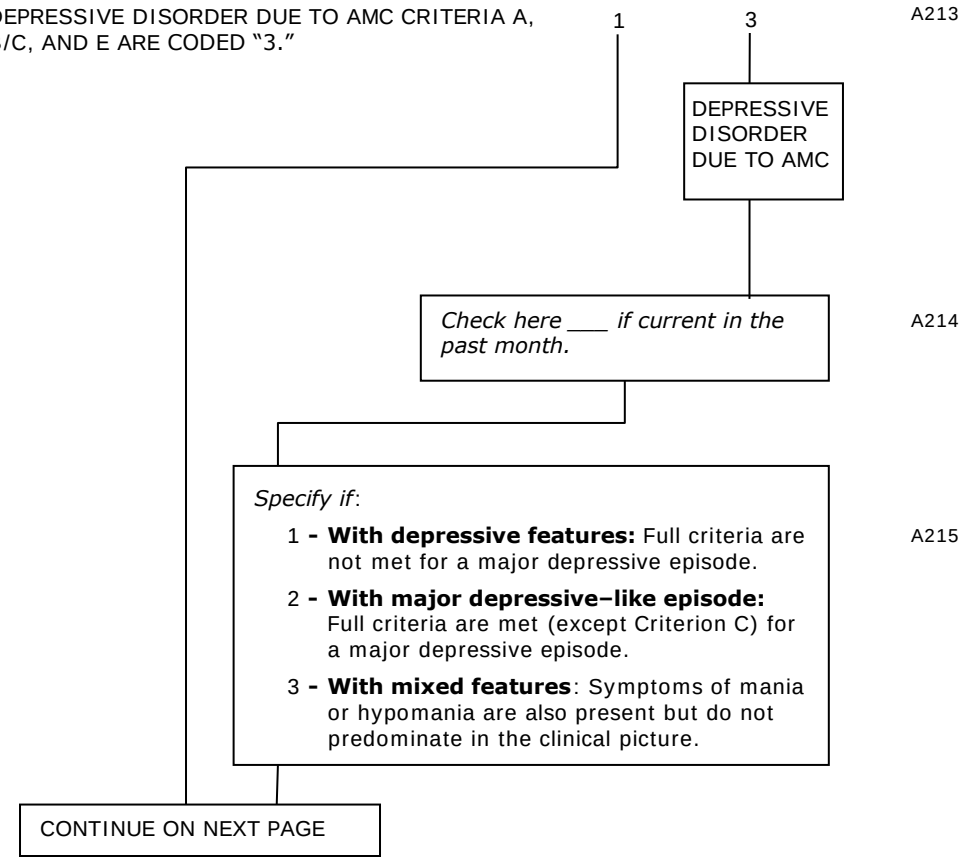
IF HAVE NOT INTERFERED WITH LIFE: **How much have** (DEPRESSIVE SXS) **bothered or upset you?**

E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A212

GO TO ***SUBSTANCE INDUCED*** A.48

NOTE: The D criterion (delirium rule-out) has been omitted.


DEPRESSIVE DISORDER DUE TO AMC CRITERIA A, B/C, AND E ARE CODED "3."
1
3
A213
DEPRESSIVE DISORDER DUE TO AMC
Check here ___ if current in the past month.
A214
Specify if:
1 - With depressive features: Full criteria are not met for a major depressive episode.
2 - With major depressive–like episode: Full criteria are met (except Criterion C) for a major depressive episode.
3 - With mixed features: Symptoms of mania or hypomania are also present but do not predominate in the clinical picture.
A215
CONTINUE ON NEXT PAGE

SUBSTANCE-/MEDICATION-INDUCED DEPRESSIVE DISORDER

SUBSTANCE-/MEDICATION-INDUCED DEPRESSIVE DISORDER CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH SUBSTANCE/MEDICATION USE, CHECK HERE ___ AND RETURN TO EPISODE BEING EVALUATED, CONTINUING WITH THE ITEM FOLLOWING "SYMPTOMS ARE NOT ATTRIBUTABLE TO THE PHYSIOLOGICAL EFFECTS OF A SUBSTANCE OR ANOTHER MEDICAL CONDITION" (SEE PAGE NUMBERS IN BOX TO THE RIGHT).

PAGE TO RETURN TO IN EPISODE BEING EVALUATED:	
Current MDE	A.4
Past MDE	A.9
Current Persistent Depressive Disorder	A.31
Past Persistent Depressive Disorder	A.34
PMDD	A.40
Other Specified Depressive Disorder	D.12

A216

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. A prominent and persistent disturbance in mood that predominates in the clinical picture and is characterized by depressed mood or markedly diminished interest or pleasure in all, or almost all, activities

? 1 2 3 A217

IF UNKNOWN: **When did the** (DEPRESSIVE SXS) **begin? Were you already using** (SUBSTANCE/MEDICATION) **or had you just stopped or cut down your use?**

IF UNKNOWN: **How much** (SUBSTANCE/MEDICATION) **were you using when you began to have** (DEPRESSIVE SXS)**?**

B. There is evidence from the history, physical examination, or laboratory findings of both (1) and (2):

1. The symptoms in criterion A developed during or soon after substance intoxication or withdrawal or exposure to a medication

2. The involved substance/medication is capable of producing the symptoms in Criterion A.

NOTE: refer to list of etiological substances/ medications on page A.4.

? 1 2 3 A218

→ NOT SUBSTANCE-INDUCED.RETURN TO EPISODE BEING EVALUATED

ASK ANY OF THE FOLLOWING QUESTIONS AS NEEDED TO RULE OUT A NON-SUBSTANCE-INDUCED ETIOLOGY.

IF UNKNOWN: **Which came first, the** (SUBSTANCE/MEDICATION USE) **or the** (DEPRESSIVE SXS)**?**

IF UNKNOWN: **Have you had a period of time when you stopped using** (SUBSTANCE/MEDICATION)**?**

IF YES: **After you stopped using** (SUBSTANCE/MEDICATION) **did the** (DEPRESSIVE SXS) **go away or get better?**

IF YES: **How long did it take for them to get better? Did they go away within a month of stopping?**

IF UNKNOWN: **Have you had any other episodes of** (DEPRESSIVE SXS)?

IF YES: **How many? Were you using** (SUBSTANCE/MEDICATION) **at those times?**

C. The disturbance is NOT better accounted for by a depressive disorder that is not substance-induced. Such evidence of an independent depressive disorder could include the following:

? 1 3 A219

RETURN TO EPISODE BEING EVALUATED

NOTE: The following three statements constitute evidence that the depressive symptoms are not substance-induced. Code "1" if any are true. Code "3" only if *none* are true.

1) The symptoms precede the onset of the substance/medication use;
2) The symptoms persist for a substantial period of time (e.g., about 1 month) after the cessation of acute withdrawal or severe intoxication; or
3) There is other evidence suggesting the existence of an independent non-substance/ medication-induced depressive disorder (e.g., a history of recurrent non-substance/ medication-related episodes).

IF UNKNOWN: **What effect have** (DEPRESSIVE SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (DEPRESSIVE SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (DEPRESSIVE SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have (DEPRESSIVE SXS) **affected your ability to take care of things at home? How about doing simple everyday things like getting dressed, bathing, or brushing your teeth? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Have (DEPRESSIVE SXS) **affected any other important part of your life?**

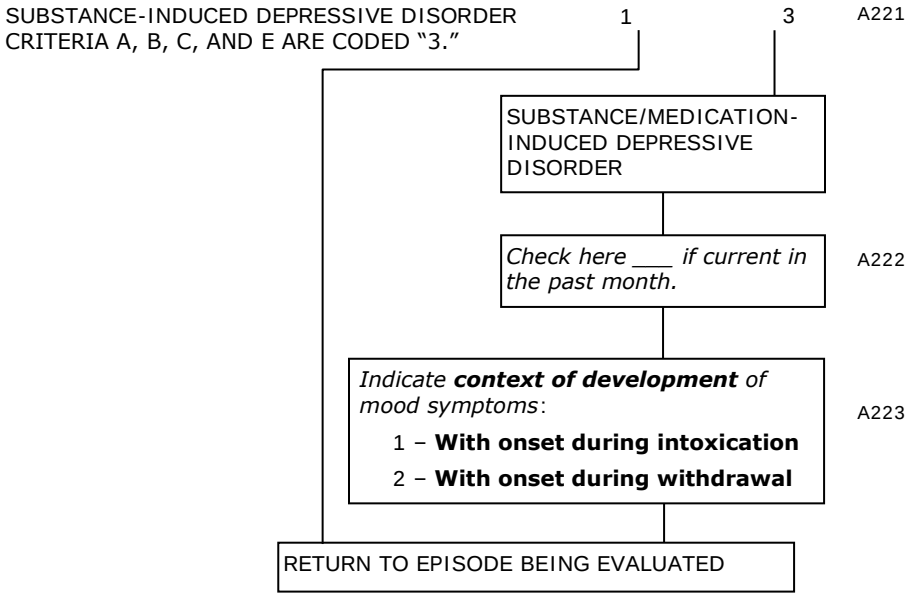
IF HAVE NOT INTERFERED WITH LIFE: **How much have** (DEPRESSIVE SXS) **bothered or upset you?**

E. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 A220

RETURN TO EPISODE BEING EVALUATED

NOTE: the D criterion (delirium rule-out) has been omitted.


SUBSTANCE-INDUCED DEPRESSIVE DISORDER
CRITERIA A, B, C, AND E ARE CODED "3."
1
3
A221
SUBSTANCE/MEDICATION-INDUCED DEPRESSIVE DISORDER
Check here ___ if current in the past month.
A222
Indicate context of development of mood symptoms:
1 – With onset during intoxication
2 – With onset during withdrawal
A223
RETURN TO EPISODE BEING EVALUATED

B/C. PSYCHOTIC SCREENING MODULE

NOTE: This module is for coding psychotic and associated symptoms that have been present at any point in the subject's lifetime. It can be used for settings in which cases with primary psychotic symptoms are to be excluded i.e., psychotic symptoms that are not due to substance/medication use or to a general medical condition) and/or psychotic symptoms that occur outside the context of a Major Depressive or Manic Episode.

For each psychotic symptom coded "3," describe the actual content and indicate the period of time during which the symptom was present. Moreover, for any psychotic symptom coded "3." determine whether the symptom is definitely "primary" or whether there is a possible or definite etiological substance (including medication) or general medical condition. Refer to page B/C.6 for a list of possible etiological general medical conditions and substances/medications.

The following questions may be useful if the Overview has not already provided the information.

Just before (PSYCHOTIC SXS) **began, were you using drugs? ...were you taking any medications? ...did you drink much more than usual or stop drinking after you had been drinking a lot for a while? ...were you physically ill?**

IF YES TO ANY: **Has there been a time when you had** (PSYCHOTIC SXS) **and were not** (USING DRUGS/TAKING MEDICATION/CHANGING YOUR DRINKING HABITS/ILL)**?**

DELUSIONS

Now I'd like to ask you about unusual experiences that people sometimes have.

A false belief based on incorrect inference about external reality that is firmly held despite what almost everyone else believes and despite what constitutes incontrovertible and obvious proof or evidence to the contrary. The belief is not one ordinarily accepted by other members of the person's culture or subculture. When a false belief involves a value judgment, it is regarded as a delusion only when the judgment is so extreme as to defy credibility. Code overvalued ideas (unreasonable and sustained beliefs that are maintained with less than delusional intensity) as "2."

Has it ever seemed like people were talking about you or taking special notice of you? (What do you think they were saying about you?)

IF YES: **Were you convinced they were talking about you or did you think it might have been your imagination?**

Did you ever have the feeling that something on the radio, TV, or in a movie was meant especially for you? (...not just that it was particularly relevant to you, but that it was specifically meant for you.)

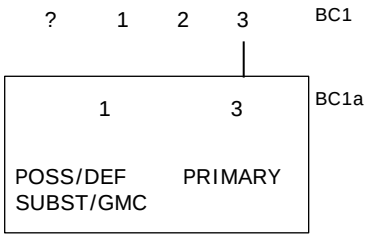
Did you ever have the feeling that the words in a popular song were meant to send you a special message? (...not just that they were particularly relevant to you, but that they were specifically meant for you.)

Did you ever have the feeling that what people were wearing was intended to send you a special message?

Did you ever have the feeling that street signs or billboards had a special meaning for you?

Delusion of reference, i.e., events, objects, or other persons in the individual's immediate environment are seen as having a particular and unusual significance.

DESCRIBE:



What about anyone going out of their way to give you a hard time, or trying to hurt you? (Tell me about that.)

Have you ever had the feeling that you were being followed, spied on, manipulated, or plotted against?

Did you ever have the feeling that you were being poisoned or that your food had been tampered with?

Persecutory delusion, i.e., the central theme is that one (or someone to whom one is close to) is being attacked, harassed, cheated, persecuted, or conspired against.

DESCRIBE:

? 1 2 3 BC2

1 3 BC2a

POSS/DEF PRIMARY
SUBST/GMC

Have you ever thought that you were especially important in some way, or that you had special powers or knowledge? (Tell me about that.)

Did you ever believe that you had a special or close relationship with a celebrity or someone else famous?

Grandiose delusion, i.e., content involves inflated worth, power, knowledge identity, or a special relationship to a deity or famous person.

DESCRIBE:

? 1 2 3 BC3

1 3 BC3a

POSS/DEF PRIMARY
SUBST/GMC

Have you ever been convinced that something was very wrong with your physical health even though your doctor said nothing was wrong...like you had cancer or some other disease? (Tell me about that.)

Have you ever felt that something strange was happening to parts of your body?

Somatic delusion, i.e., main content pertains to the appearance or functioning of one's body.

DESCRIBE:

? 1 2 3 BC4

1 3 BC4a

POSS/DEF PRIMARY
SUBST/GMC

Have you ever felt that you had committed a crime or done something terrible for which you should be punished? (Tell me about that.)

Have you ever felt that something you did, or should have done but did not do, caused serious harm to your parents, children, other family members, or friends?

What about feeling responsible for a disaster such as a fire, flood, or earthquake?

Delusion of guilt, i.e., a belief that a minor error in the past will lead to disaster, or that he or she has committed a horrible crime and should be punished severely, or that he or she is responsible for a disaster (e.g., an earthquake or fire) with which there can be no possible connection

DESCRIBE:

? 1 2 3 BC5

1 3 BC5a

POSS/DEF PRIMARY
SUBST/GMC

Have you ever been convinced that your spouse or partner was being unfaithful to you?

IF YES: **How did you know they were being unfaithful? (What clued you into this?)**

Jealous delusion, i.e., that one's sexual partner is unfaithful

DESCRIBE:

? 1 2 3 BC6

1 3 BC6a

POSS/DEF PRIMARY
SUBST/GMC

Did you ever have a "secret admirer" who, when you tried to contact them, denied that they were in love with you? (Tell me about that.)

Were you ever romantically involved with someone famous? (Tell me about that.)

Erotomanic delusion, i.e., that another person, usually of higher status, is in love with the individual.

DESCRIBE:

? 1 2 3 BC7

1 3 BC7a

POSS/DEF SUBST/GMC PRIMARY

Are you a religious or spiritual person?

- *IF YES*: **Have you ever had any religious or spiritual experiences that the other people in your religious or spiritual community have not experienced?**
  - *IF YES*: **Tell me about your experiences. (What did they think about these experiences of yours?)**
  - *IF NO*: **Have you ever felt that God, the devil, or some other spiritual being or higher power has communicated directly with you? (Tell me about that. Do others in your religious or spiritual community also have such experiences?)**
- *IF NO*: **Have you ever felt that God, or the devil or some other spiritual being or higher power has communicated directly with you? (Tell me about that. Do others in your religious or spiritual community also have such experiences?)**

Religious delusion, i.e., a delusion with a religious or spiritual content.

DESCRIBE:

? 1 2 3 BC8

1 3 BC8a

POSS/DEF SUBST/GMC PRIMARY

Did you ever feel that someone or something outside yourself was controlling your thoughts or actions against your will? (Tell me about that.

Delusion of being controlled, i.e., feelings, impulses, thoughts, or actions are experienced as being under the control of some external force rather than under one's own control.

DESCRIBE:

? 1 2 3 BC9

1 3 BC9A

POSS/DEF SUBST/GMC PRIMARY

Did you ever feel that certain thoughts that were not your own were put into your head? (Tell me about that.)

Thought insertion, i.e., that certain thoughts are not one's own, but rather are inserted into one's mind.

DESCRIBE:

? 1 2 3 BC10

1 3 BC10a

POSS/DEF SUBST/GMC PRIMARY

What about thoughts being taken out of your head? (Tell me about that.)

Thought withdrawal, i.e., that one's thoughts have been "removed" by some outside force.

DESCRIBE:

? 1 2 3 BC11

1 3 BC11a

POSS/DEF SUBST/GMC PRIMARY

Did you ever feel as if your thoughts were being broadcast out loud so that other people could actually hear what you were thinking? (Tell me about that.)

Thought broadcasting, i.e., the delusion that one's thoughts are being broadcast out loud so that others can perceive them.

DESCRIBE:

? 1 2 3 BC12

1 3 BC12a

POSS/DEF PRIMARY
SUBST/GMC

Did you ever believe that someone could read your mind? (Tell me about that.)

Other delusions (e.g., that others can read the person's mind, a delusion that one has died several years ago).

DESCRIBE:

? 1 2 3 BC13

1 3 BC13a

POSS/DEF PRIMARY
SUBST/GMC

HALLUCINATIONS

A perception-like experience with the clarity and impact of a true perception, but without the external stimulation of the relevant sensory organ. The person may or may not have insight into the nonveridical nature of the hallucination (i.e., one hallucinating person may recognize the false sensory experience, whereas another may be convinced that the experience is grounded in reality).

NOTE: Code "2" for hallucinations that are so transient as to be without diagnostic significance. Code "1" for hypnagogic or hypnopompic hallucinations.

Did you ever hear things that other people couldn't, such as noises, or the voices of people whispering or talking? (Were you awake at the time?)

IF YES: **What did you hear? How often did you hear it?**

Auditory hallucinations, i.e., involving the perception of sound, most commonly of voice) when fully awake, heard either inside or outside of one's head.

DESCRIBE:

? 1 2 3 BC14

1 3 BC14a

POSS/DEF PRIMARY
SUBST/GMC

Did you have visions or see things that other people couldn't see? (Tell me about that. Were you awake at the time?)

NOTE: DISTINGUISH FROM AN ILLUSION, I.E., A MISPERCEPTION OF A REAL EXTERNAL STIMULUS.

Visual hallucinations, i.e., a hallucination involving sight, which may consist of formed images, such as of people or of unformed images, such as flashes of light.

DESCRIBE:

? 1 2 3 BC15

1 3 BC15a

POSS/DEF PRIMARY
SUBST/GMC

What about strange sensations on your skin, like feeling like something is creeping or crawling on or under your skin? How about the feeling of being touched or stroked? (Tell me about that.)

Tactile hallucinations, i.e., a hallucination involving the perception of being touched or of something being under one's skin.

DESCRIBE

? 1 2 3 BC16

1 3 BC16a

POSS/DEF PRIMARY
SUBST/GMC

What about having unusual sensations inside a part of your body, like a feeling of electricity? (Tell me about that.)

Somatic hallucination, i.e., a hallucination involving the perception of physical experience localized within the body (e.g., a feeling of electricity).

DESCRIBE:

? 1 2 3 BC17

1 3 BC17a

POSS/DEF SUBST/GMC | PRIMARY

How about eating or drinking something that you thought tasted bad or strange even though everyone else who tasted it thought it was fine? (Tell me about that.)

Gustatory hallucinations, i.e., a hallucination involving the perception of taste (usually unpleasant)

DESCRIBE:

? 1 2 3 BC18

1 3 BC18a

POSS/DEF SUBST/GMC | PRIMARY

What about smelling unpleasant things that other people couldn't smell, like decaying food or dead bodies? (Tell me about that.)

Olfactory hallucinations, i.e., a hallucination involving the perception of odor

DESCRIBE:

? 1 2 3 BC19

1 3 BC19a

POSS/DEF SUBST/GMC | PRIMARY

ANY ITEM CODED "3" IN "PRIMARY" SECTION

? 1 3 BC20

1: GO TO NEXT MODULE

3: A PRIMARY PSYCHOTIC SX HAS BEEN PRESENT

IF A MAJOR DEPRESSIVE OR MANIC EPISODE HAS EVER BEEN PRESENT: **Has there ever been a time when you had** (PSYCHOTIC SXS) **and you were not** (**depressed/high/irritable**/OWN WORDS)**?**

Psychotic symptoms occur at times other than during mood episodes.

NOTE: Code "3" if psychotic symptoms have been present and either: 1) there have never been any Major Depressive or Manic Episodes, or 2) psychotic symptoms occurred outside of Major Depressive or Manic Episodes. Code '1" if psychotic symptoms have occurred only during Major Depressive or Manic Episodes.

? 1 3 BC21

1: PSYCHOTIC MOOD DISORDER. GO TO NEXT MODULE

3: PSYCHOTIC DISORDER LIKELY

EXPLORE DETAILS AND DESCRIBE DIAGNOSTIC SIGNIFICANCE: BC22

?=Inadequate information 1=Absent or false 2=Subthreshold 3=Threshold or true

Etiological general medical conditions *include:*

Neurological conditions (e.g., neoplasms, cerebrovascular disease, Huntington's disease, multiple sclerosis, epilepsy, auditory or visual nerve injury or impairment, deafness, migraine, central nervous system infections), endocrine conditions (e.g., hyper- and hypothyroidism, hyper- and hypoparathyroidism, hyper- and hypoadrenocorticism), metabolic conditions (e.g., hypoxia, hypercarbia, hypoglycemia), fluid or electrolyte imbalances, hepatic or renal diseases, and autoimmune disorders with central nervous system involvement (e.g., systemic lupus erythematosus).

Etiological substances/medications *include:*

Alcohol (during intoxication or withdrawal); cannabis (during intoxication); hallucinogens (during intoxication), phencyclidine (and related substances (during intoxication); inhalants (during intoxication); sedatives, hypnotics, and anxiolytics (during intoxication or withdrawal); and stimulants (including cocaine) (during intoxication);

Other substances and medications that can cause psychotic symptoms include anesthetics and analgesics, anticholinergic agents, anticonvulsants, antihistamines, antihypertensive and cardiovascular medications, antimicrobial medications, antiparkinsonian medications, chemotherapeutic agents (e.g., cyclosporine, procarbazine), corticosteroids, gastrointestinal medications, muscle relaxants, nonsteroidal anti-inflammatory medications, other over-the-counter medications (e.g., phenylephrine, pseudoephedrine), antidepressant medication, and disulfiram. Toxins include anticholinesterase, organophosphate insecticides, sarin and other nerve gases, carbon monoxide, carbon dioxide, and volatile substances such as fuel or paint.

E. SUBSTANCE USE DISORDERS

PAST-12-MONTH ALCOHOL USE DISORDER

→ IF DENIES ANY LIFETIME ALCOHOL USE ON PAGE 6 OF PATIENT OVERVIEW (OR PAGE 4 OF NON-PATIENT OVERVEW), CHECK HERE ___ AND GO TO ***NON-ALCOHOL SUBSTANCE USE DISORDERS*** E.10

→ *IF ACKNOWLEDGES LIFETIME ALCOHOL USE DURING OVERVIEW AND IF UNKNOWN:* **Have you drunk alcohol at least six times in the past 12 months, that is, since** (1 YEAR AGO)**?**

→ *IF YES:* **Now I'd like to ask you some more questions about your drinking since** (1 YEAR AGO)…

→ *IF NO:* GO TO ***PRIOR-TO-PAST-12-MONTH ALCOHOL USE DISORDER*** E.6.

ALCOHOL USE DISORDER CRITERIA

E1

A. A problematic pattern of alcohol use, leading to clinically significant impairment or distress, as manifested by at least two of the following occurring within a 12-month period:

NOTE: The DSM-IV examples that were omitted in DSM-5 have been restored here.

During the past year, have you found that once you started drinking you ended up drinking much more than you <u>intended</u> to? For example, you planned to have only one or two drinks but you ended up having many more. (Tell me about that. How often did this happen?)

IF NO: **What about drinking for a much longer period of time than you were <u>intending</u> to?**

1. Alcohol is often taken in larger amounts OR over a longer period than was intended. ? 1 2 3 E2

During the past year, have you wanted to stop, cut down, or control your drinking?

→ *IF YES:* **How long did this desire to stop, cut down, or control your drinking last?**

→ *IF NO:* **During the past year, did you ever try to cut down, stop, or control your drinking? How successful were you? (Did you make more than one attempt to stop, cut down, or control your drinking?)**

2. There is a persistent desire OR unsuccessful efforts to cut down or control alcohol use. ? 1 2 3 E3

Have you spent a lot of time drinking, being drunk, or hung over? (How much time?)

3. A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects. ? 1 2 3 E4

Have you had a strong desire or urge to drink in between those times when you were drinking? (Has there been a time when you had such strong urges to have a drink that you had trouble thinking about anything else?) *IF NO:* **How about having a strong desire or urge to drink when you were around bars or around people with whom you go drinking?**	4. Craving, or a strong desire or urge to use alcohol.	?	1	2	3	E5
During the past year, since (1 YEAR AGO)**, have you missed work or school or often arrived late because you were intoxicated, high, or very hung over?** *IF NO:* **How about doing a bad job at work or school, or failing courses or flunking out of school because of your drinking?** *IF NO:* **How about getting in trouble at work or school because of your use of alcohol?** *IF NO:* **How about not taking care of things at home because of your drinking, like making sure there is food and clean clothes for your family and making sure your children go to school and get medical care? How about not paying your bills?** *IF YES TO ANY:* **How often?**	5. Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home [(e.g., repeated absences or poor work performance related to alcohol use; alcohol-related absences, suspensions, or expulsions from school; neglect of children or household)].	?	1	2	3	E6
Has your drinking caused problems with other people, such as family members, friends, or people at work? (Have you found yourself regularly getting into arguments about what happens when you drink too much? Have you gotten into physical fights when you were drunk?) *IF YES:* **Have you kept on drinking anyway?**	6. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol [(e.g., arguments with spouse about consequences of intoxication, physical fights)].	?	1	2	3	E7
Have you had to give up or reduce the time you spent at work or school, with family or friends, or on things you like to do (like sports, cooking, other hobbies) because you were drinking or hungover?	7. Important social, occupational, or recreational activities given up or reduced because of alcohol use.	?	1	2	3	E8
During the past year, since (1 YEAR AGO)**, have you ever had a few drinks right before doing something that requires coordination and concentration like driving, boating, climbing on a ladder, or operating heavy machinery?** *IF YES:* **Would you say that the amount you had to drink affected your coordination or concentration so that it was more likely that you or someone else could have been hurt?** *IF YES AND UNKNOWN:* **How many times? (When?)**	8. Recurrent alcohol use in situations in which it is physically hazardous [(e.g., driving an automobile or operating a machine when impaired by alcohol use)].	?	1	2	3	E9

Has your drinking caused you any problems like making you very depressed or anxious? How about putting you in a "mental fog," making it difficult for you to sleep, or making it so you couldn't recall what happened while you were drinking?

Has your drinking caused significant physical problems or make a physical problem worse, like stomach ulcers, liver disease, or pancreatitis?

IF YES TO EITHER OF ABOVE: **Have you kept on drinking anyway?**

9. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol [(e.g., continued drinking despite recognition that an ulcer was made worse by alcohol consumption)].

? 1 2 3 E10

Have you found that you needed to drink much more in order to get the feeling you wanted than you did when you first started drinking?

→ *IF YES*: **How much more?**

→ *IF NO*: **What about finding that when you drank the same amount, it had much less effect than before? (How much less?)**

10. Tolerance, as defined by either of the following:

a. A need for markedly increased amounts of alcohol to achieve intoxication or desired effect.

b. Markedly diminished effect with continued use of the same amount of alcohol.

? 1 2 3 E11

During the past year, since (1 YEAR AGO)**, have you had any withdrawal symptoms, in other words, feeling sick when you cut down or stopped drinking?**

→ *IF YES:* **What symptoms did you have? (Sweating or a racing heart? Your hand[s] shaking? Trouble sleeping? Feeling nauseated or vomiting? Feeling agitated? Feeling anxious? How about having a seizure or seeing, feeling, or hearing things that weren't really there?)**

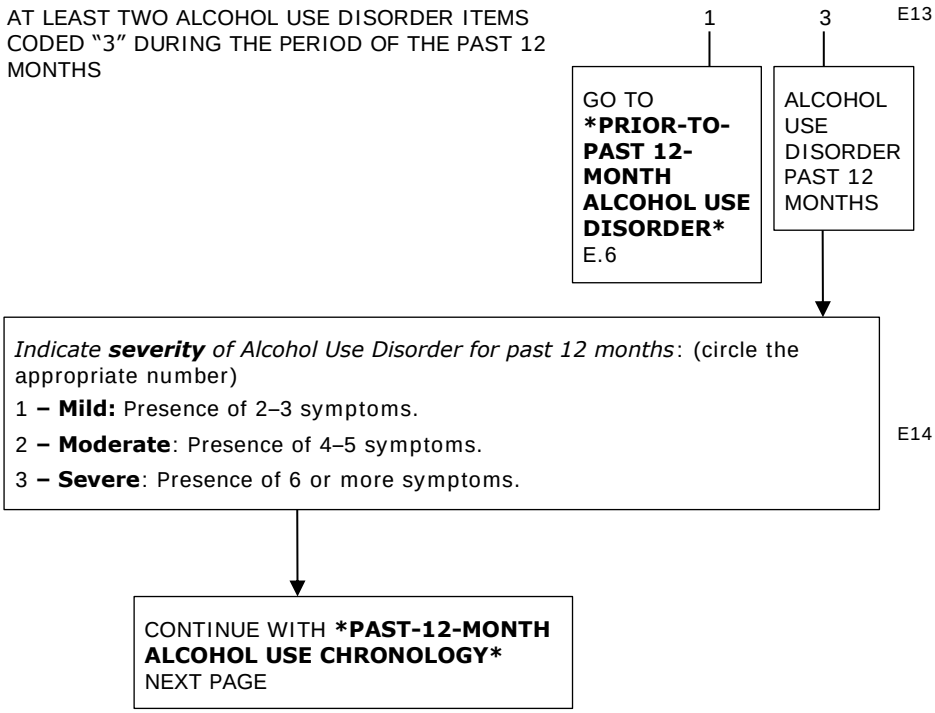
→ *IF NO:* **During the past year, have you ever started the day with a drink, or did you often drink or take some other drug or medication to keep yourself from getting the shakes or becoming sick?**

11. Withdrawal, as manifested by either of the following:

a. At least <u>TWO</u> of the following developing within several hours to a few days after the cessation of (or reduction in) alcohol use:
   - autonomic hyperactivity (e.g., sweating or pulse rate greater than 100 bpm)
   - increased hand tremor
   - insomnia
   - nausea or vomiting
   - psychomotor agitation
   - anxiety
   - generalized tonic-clonic seizures
   - transient visual, tactile, or auditory hallucinations or illusions

b. Alcohol (or a closely related substance such as a benzodiazepine) is taken to relieve or avoid withdrawal symptoms.

? 1 2 3 E12


AT LEAST TWO ALCOHOL USE DISORDER ITEMS CODED "3" DURING THE PERIOD OF THE PAST 12 MONTHS
1
3
E13
GO TO ***PRIOR-TO-PAST 12-MONTH ALCOHOL USE DISORDER*** E.6
ALCOHOL USE DISORDER PAST 12 MONTHS
*Indicate **severity** of Alcohol Use Disorder for past 12 months*: (circle the appropriate number)
1 **– Mild:** Presence of 2–3 symptoms.
2 **– Moderate**: Presence of 4–5 symptoms.
3 **– Severe**: Presence of 6 or more symptoms.
E14
CONTINUE WITH ***PAST-12-MONTH ALCOHOL USE CHRONOLOGY*** NEXT PAGE

PAST-12-MONTH ALCOHOL USE DISORDER CHRONOLOGY

During the past 3 months, how much have you been drinking?

At least one Alcohol Use Disorder symptom (except for craving) in the past 3 months

1 3 E15

IF HAD ANYTHING TO DRINK IN PAST 3 MONTHS: **Has your drinking caused any problems for you in the past 3 months?** (Problems like [ALCOHOL USE ITEMS CODED "3"]?)

CURRENT ALCOHOL USE DISORDER (PAST 3 MONTHS)

Number of months prior to interview when the subject last had any Alcohol Use Disorder symptom (except for craving). ___ ___ ___ E16

GO TO ***AGE AT ONSET*** BOTTOM OF THIS PAGE

Check ____ *if* **In a controlled environment**: The individual is [currently] in a controlled environment where access to alcohol is restricted. E17

Indicate ***remission:*** (circle the appropriate number)

1 – **In early remission:** After full criteria for Alcohol Use Disorder were previously met, none of the criteria for Alcohol Use Disorder have been met for at least 3 months but for less than 12 months (with the exception that Criterion A.4, "Craving, or a strong desire or urge to use alcohol," may be met). E18

(Sustained Remission does not apply to Past 12-month Alcohol Use Disorder)

AGE AT ONSET

How old were you when you first had (LIST OF ALCOHOL USE DISORDER SXS CODED "3")**?**

Age at onset of Alcohol Use Disorder (CODE 99 IF UNKNOWN). ____ ____ E19

GO TO ***PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER*** E.10

NOTE: If an assessment of the severity of Alcohol Use Disorder prior to the past 12 months is needed, continue on next page instead of skipping to E.10

PRIOR-TO-PAST-12-MONTH ALCOHOL USE DISORDER

IF ALCOHOL USE PRIOR-TO-PAST-12 MONTHS IS NOT EXCESSIVE AND NON-PROBLEMATIC ACCORDING TO QUESTIONS ON PAGE 6 OF PATIENT OVERVIEW (OR PAGE 4 OF NON-PATIENT OVERVIEW), SCREEN FOR LIFETIME ALCOHOL USE THRESHOLD WITH THE FOLLOWING:

Besides the past year, have you ever drunk alcohol at least six times in a 12-month period?

→ *IF YES:* **When was that?**

→ *IF NEVER DRANK SIX TIMES IN 12-MONTH PERIOD, CHECK HERE ___ AND GO TO* ***PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDERS*** *E.10.* E20

Looking back over your life, if you had to pick a 12-month period when you were drinking the most or during which your drinking caused you the most problems, when would that have been?

Indicate month and year:
___ / ___ E21

ALCOHOL USE DISORDER CRITERIA

Now I'd like to ask you some questions about your drinking during (12-MONTH PERIOD SELECTED ABOVE)**.**

A. A problematic pattern of alcohol use, leading to clinically significant impairment or distress, as manifested by at least two of the following occurring within a 12-month period:

During that time, did you find that once you started drinking you ended up drinking much more than you intended to? For example, you planned to have only one or two drinks but you ended up having many more. (Tell me about that. How often did this happen?)

IF NO: **What about drinking for a much longer period of time than you were intending to?**

1. Alcohol is often taken in larger amounts OR over a longer period than was intended. ? 1 2 3 E22

During (12-MONTH PERIOD) **did you want to stop, cut down, or control your drinking?**

→ *IF YES:* **How long did this desire to stop, cud down, or control your drinking last?**

→ *IF NO:* **Did you try to cut down, stop, or control your drinking? How successful were you? (Did you make more than one attempt to stop, cut down, or control your drinking?)**

2. There is a persistent desire OR unsuccessful efforts to cut down or control alcohol use. ? 1 2 3 E23

During (12-MONTH PERIOD)**, did you ever spend a lot of time drinking, being drunk, or hung over? (How much time?)**

3. A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects. ? 1 2 3 E24

Did you have a strong desire or urge to drink in between those times when you were drinking? (Was there a time when you had such strong urges to have a drink that you had trouble thinking about anything else?)

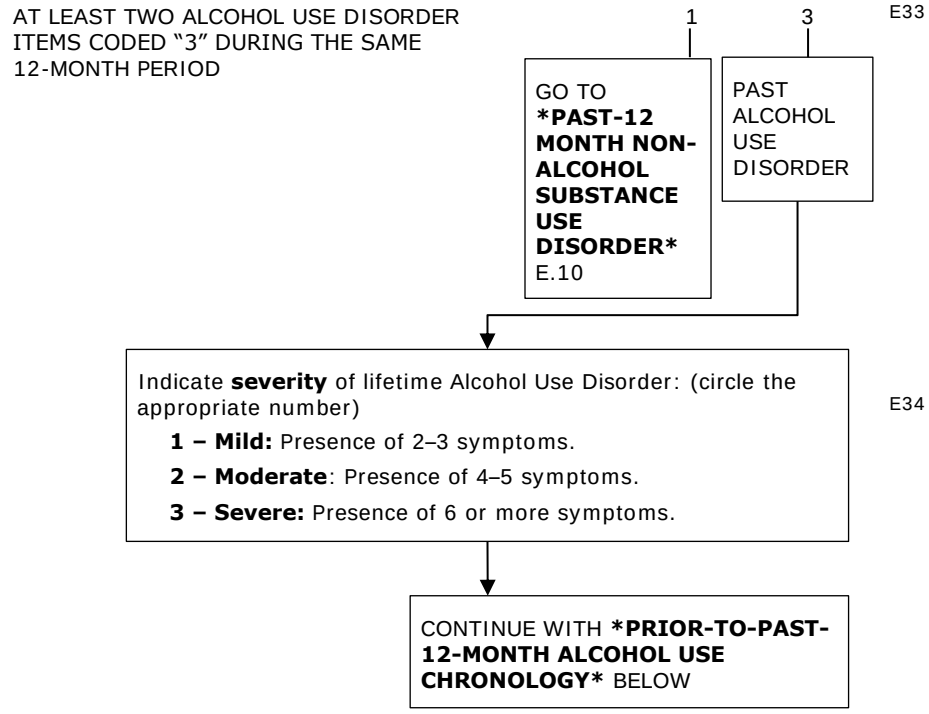
IF NO: **How about having a strong desire or urge to drink when you were around bars or around people with whom you went drinking?**

4. Craving, or a strong desire or urge to use alcohol. ? 1 2 3 E25

?=Inadequate information 1=Absent or false 2=Subthreshold 3=Threshold or true

During (12-MONTH PERIOD), **did you ever miss work or school or often arrive late because you were intoxicated, high, or very hung over?** *IF NO:* **How about doing a bad job at work or school, or failing courses or flunking out from school because of your drinking?** *IF NO:* **How about getting in trouble at work or school because of your use of alcohol?** *IF NO:* **How about not taking care of things at home because of your drinking, like making sure there is food and clean clothes for your family and making sure your children go to school and get medical care? How about not paying your bills?** *IF YES TO ANY:* **How often?**	5. Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home [(e.g., repeated absences or poor work performance related to alcohol use; alcohol-related absences, suspensions, or expulsions from school; neglect of children or household)].	?	1	2	3	E26
During (12-MONTH PERIOD)**, did your drinking cause problems with other people, such as family members, friends, or people at work? (Did you find yourself regularly getting into arguments about what happens when you drink too much? Did you get into physical fights when you were drunk?)** *IF YES:* **Did you keep on drinking anyway? (Over what period of time)?**	6. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol [(e.g., arguments with spouse about consequences of intoxication, physical fights)].	?	1	2	3	E27
During (12-MONTH PERIOD)**, did you have to give up or reduce the time you spent at work or school, with family or friends, or on things you like to do (like sports, cooking, other hobbies) because you were drinking or hungover?**	7. Important social, occupational, or recreational activities given up or reduced because of alcohol use.	?	1	2	3	E28
During (12-MONTH PERIOD)**, did you have a few drinks right before doing something that required coordination and concentration like driving, boating, climbing on a ladder, or operating heavy machinery?** *IF YES:* **Would you say that the amount you had to drink affected your coordination or concentration so that it was more likely that you or someone else could have been hurt?** *IF YES AND UNKNOWN:* **How many times?**	8. Recurrent alcohol use in situations in which it is physically hazardous [(e.g., driving an automobile or operating a machine when impaired by alcohol use)].	?	1	2	3	E29

Did your drinking cause you any problems like making you very depressed or anxious? How about putting you in a "mental fog," making it difficult for you to sleep, or making it so you couldn't recall what happened while you were drinking? **Did your drinking cause significant physical problems or make a physical problem worse, like stomach ulcers, liver disease, or pancreatitis?** *IF YES TO EITHER OF ABOVE:* **Did you keep on drinking anyway?**	9. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol [(e.g., continued drinking despite recognition that an ulcer was made worse by alcohol consumption)].	?	1	2	3	E30
During (12-MONTH PERIOD)**, did you need to drink much more in order to get the feeling you wanted than you did when you first started drinking?** → *IF YES*: **How much more?** → *IF NO:* **What about finding that when you drank the same amount, it had much less effect than before? (How much less?)**	10. Tolerance, as defined by either of the following: a. A need for markedly increased amounts of alcohol to achieve intoxication or desired effect. b. Markedly diminished effect with continued use of the same amount of alcohol.	?	1	2	3	E31
During (12-MONTH PERIOD)**, did you ever have any withdrawal symptoms, in other words feeling sick when you cut down or stopped drinking?** → *IF YES:* **What symptoms did you have? (Sweating or a racing heart? Your hand[s] shaking? Trouble sleeping? Feeling nauseated or vomiting? Feeling agitated? Feeling anxious? How about having a seizure or seeing, feeling, or hearing things that weren't really there?)** → *IF NO:* **Did you ever start the day with a drink, or did you often drink or take some other drug or medication to keep yourself from getting the shakes or becoming sick?**	11. Withdrawal, as manifested by either of the following: a. At least <u>TWO</u> of the following developing within several hours to a few days after the cessation of (or reduction in) alcohol use: ▪ autonomic hyperactivity (e.g., sweating or pulse rate greater than 100 bpm) ▪ increased hand tremor ▪ insomnia ▪ nausea or vomiting ▪ psychomotor agitation ▪ anxiety ▪ generalized tonic-clonic seizures ▪ transient visual, tactile, or auditory hallucinations or illusions b. Alcohol (or a closely related substance such as a benzodiazepine) is taken to relieve or avoid withdrawal symptoms.	?	1	2	3	E32



PRIOR-TO-PAST-12-MONTH ALCOHOL USE DISORDER CHRONOLOGY

REMISSION SPECIFIER FOR PAST ALCOHOL USE DISORDER

Check ____ if **In a controlled environment:** The individual is [currently] in an environment where access to alcohol is restricted E35

*Indicate **remission***: (circle the appropriate number)

(Early Remission does not apply to Alcohol Use Disorder Prior to Past 12 months)

0 **– Not in remission** (i.e., one Substance Use Disorder criterion has been present during the past 12 months) E36

2 **– In sustained remission:** After full criteria for Alcohol Use Disorder were previously met, none of the criteria for Alcohol Use Disorder have been met at any time during a period of 12 months or longer (with the exception that Criterion A.4, "Craving, or a strong desire or urge to use alcohol," may be met).

AGE AT ONSET

How old were you when you first had (LIST OF ALCOHOL USE DISORDER SXS CODED "3")**?** Age at onset of Alcohol Use Disorder (CODE 99 IF UNKNOWN) ____ ____ E37

PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER

REVIEW HISTORY OF DRUG USE ON PAGES 7-8 OF PATIENT OVERVIEW (OR PAGES 5-6 OF NON-PATIENT OVERVIEW). IF DENIES ANY LIFETIME DRUG USE IN OVERVIEW, CHECK HERE ___ AND GO TO NEXT MODULE. E38

FOR DRUGS USED IN PAST 12 MONTHS: CODE "3" FOR EACH DRUG CLASS BELOW BASED ON CODING IN RIGHT HAND COLUMN OF OVERVIEW DRUG ASSESSMENT (PATIENT OVERVIEW PAGES 7-8 OR NON-PATIENT OVERVIEW PAGES 5-6). OTHERWISE, CODE "1" FOR THAT DRUG CLASS.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOIDS	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
1	1	1	1	1	1	1	1
E39	E40	E41	E42	E43	E44	E45	E46

*IF ALL DRUG CLASSES CODED "1" FOR PERIOD OF PAST 12 MONTHS, CHECK HERE ___ AND GO TO ***PRIOR-TO-PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER*** E.26.* E47

FOR ALL CLASSES CODED "3" ABOVE, CIRCLE THE APPROPRIATE COLUMN HEADERS (DRUG CLASS NAMES) ON PAGES E.11 TO E.18, BASED ON ONE OF THE FOLLOWING OPTIONS: (Indicate option used with a check mark in front of option)

___ OPTION #1: DETERMINE THE PRESENCE OF SUBSTANCE USE DISORDER IN PAST 12 MONTHS (SINGLE MOST PROBLEMATIC SUBSTANCE). E48

Which drug or medication caused you the most problems over the past 12 months, since (1 YEAR AGO)**? Which one did you use the most? (Which was your "drug of choice?")**

START WITH THE DRUG CLASS THAT WAS MOST PROBLEMATIC OR USED THE MOST. RETURN HERE IF CRITERIA ARE NOT MET FOR INITIAL DRUG CLASS AND THERE IS ALSO EVIDENCE OF CLINICALLY SIGNIFICANT USE OF OTHER DRUG CLASSES. ASK ABOUT EACH DRUG CLASS IN SEQUENCE UNTIL EITHER THE CRITERIA ARE MET FOR A SUBSTANCE USE DISORDER IN THE PAST 12 MONTHS OR ELSE NONE OF THE DRUG CLASSES MEET CRTERIA.

___ OPTION #2: DETERMINE PRESENCE OF THE THREE SUBSTANCE CLASSES MOST HEAVILY USED OR MOST PROBLEMATIC IN THE PAST 12 MONTHS. E49

Which drugs or medications caused you the most problems over the past 12 months, since (1 YEAR AGO)**? Which ones did you use the most? (Which were your "drugs of choice?")**

___ OPTION #3: DETERMINE PRESENCE OF SUBSTANCE USE DISORDER IN THE PAST 12 MONTHS FOR ALL DRUG CLASSES ABOVE SCREENING THRESHOLD. E50

NON-ALCOHOL SUBSTANCE USE DISORDER CRITERIA

Now I'd like to ask you some more questions about your use of (DRUG CLASS[ES] CIRCLED IN COLUMN HEADERS) **in the past 12 months, since** (1 YEAR AGO)**.**

A. A problematic pattern of substance use leading to clinically significant impairment or distress, as manifested by at least two of the following occurring within a 12-month period:

FOR EACH CRITERION, ASK QUESTIONS FOR CIRCLED DRUG CLASS(ES) ONLY:

During the past year, have you found that once you started using (DRUG) **you ended up using much more than you intended to? For example, you planned to have** (SMALL AMOUNT OF DRUG) **but you ended up having much more. (Tell me about that. How often did that happen?)**

IF NO: **What about using** (DRUG) **for a much longer period of time than you were intending to?**

1. The substance is often taken in larger amounts OR over a longer period than was intended.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E51	E52	E53	E54	E55	E56	E57	E58

During the past year, have you wanted to stop or cut down using (DRUG), **or control your use of** (DRUG)**?**

→ *IF YES*: **How long did this desire to stop, cut down, or control your use of** (DRUG) **last?**

→ *IF NO*: **During the past year, did you ever try to cut down, stop, or control your use of** (DRUG)**? How successful were you? (Did you make more than one attempt to stop, cut down, or control your use of** [DRUG]**?)**

2. There is a persistent desire OR unsuccessful efforts to cut down or control substance use.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E59	E60	E61	E6	E63	E64	E65	E66

During the past year, have you spent a lot of time getting (DRUG) **or using** (DRUG) **or has it taken a lot of time for you to get over the effects of** (DRUG)**? (How much time?)**

3. A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E67	E68	E69	E70	E71	E72	E73	E74

Have you had a strong desire or urge to use (DRUG) **in between those times when you were using** (DRUG)**? (Has there been a time when you had such strong urges to use** (DRUG) **that you had trouble thinking about anything else?)**

IF NO: **How about having a strong desire or urge to use** (DRUG) **when you were around people with whom you used** (DRUG)**?**

4. Craving, or a strong desire or urge to use the substance.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E75	E76	E77	E78	E79	E80	E81	E82

During the past year, have you missed work or school or often arrived late because you were intoxicated, high, or recovering from the night before?

IF NO: **How about doing a bad job at work or school, or failing courses or flunking out of school because of your use of** (DRUG)**?**

IF NO: **How about getting into trouble at work or school because of your use of** (DRUG)**?**

IF NO: **How about not taking care of things at home because of your use of** (DRUG)**, like making sure there is food and clean clothes for your family and making sure your children go to school and get medical care? How about not paying your bills?**

IF YES TO ANY: **How often?**

5. Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home [(e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E83	E84	E85	E86	E87	E88	E89	E90

IF NOT ALREADY KNOWN: **During the past year, has your use of** (DRUG) **caused problems with other people, such as with family members, friends, or people at work? (Have you found yourself regularly getting into arguments about your** [DRUG] **use? Have you gotten into physical fights when you were taking** [DRUG]**?)**

IF YES: **Have you kept on using** (DRUG) **anyway?**

6. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance [(e.g., arguments with spouse about consequences of intoxication, physical fights)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E91	E92	E93	E94	E95	E96	E97	E98

Have you had to give up or reduce the time you spent at work or school, with family or friends, or on your hobbies because you were using (DRUG) **instead?**

7. Important social, occupational, or recreational activities given up or reduced because of substance use.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E99	E100	E101	E102	E103	E104	E105	E106

During the past year, have you ever gotten high before doing something that requires coordination and concentration like driving, boating, climbing on a ladder, or operating heavy machinery?

→ *IF YES: (FOR SUBSTANCES OTHER THAN STIMULANTS):* **Would you say that your use of** (DRUG) **affected your coordination or concentration so that it was more likely that you or someone else could have been hurt?**

→ *IF YES: (FOR STIMULANTS ONLY):* **Would you say that your being high on** (STIMULANT) **made you drive recklessly like driving very fast or taking unnecessary risks?**

IF YES TO EITHER AND UNKNOWN: **How many times?**

8. Recurrent substance use in situations in which it is physically hazardous [(e.g., driving an automobile or operating a machine when impaired by substance use)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E107	E108	E109	E110	E111	E112	E113	E114

Has your use of (DRUG) **during the past year caused you any problems like making you very depressed, irritable, anxious, paranoid, or extremely agitated? What about triggering panic attacks, making it difficult for you to fall or stay asleep, putting you into a "mental fog," or making it so you couldn't recall what happened while you were using** (DRUG)**?**

Has your use of (DRUG) **caused physical problems, like heart palpitations, coughing or trouble breathing, constipation, or skin infections?**

IF YES TO EITHER OF ABOVE: **Have you kept on using** (DRUG) **anyway?**

9. Substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance [(e.g., recurrent cocaine use despite recognition of cocaine-related depression)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E115	E116	E117	E118	E119	E120	E121	E122

Have you found that you needed to use much more (DRUG) **in order to get the feeling you wanted than when you first started using it?**

→ *IF YES:* **How much more?**

→ *IF NO:* **What about finding that when you used the same amount, it had much less effect than before?**

IF PRESCRIBED MEDICATION: **Were you taking** (DRUG) **exactly as your doctor told you to? (Did you ever take more of it than was prescribed or run out of your prescription early? Did you ever go to more than one doctor in order to get the amount of medication you wanted?)**

10. Tolerance, as defined by either of the following:

    a. A need for markedly increased amounts of the substance to achieve intoxication or desired effect.

    b. Markedly diminished effect with continued use of the same amount of the substance.

Note: If opioids, sedative/hypnotic/anxiolytic medications, or stimulant medications are taken solely under appropriate medical supervision, this criterion is not considered to be met.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E123	E124	E125	E126	E127	E128	E129	E130

THE FOLLOWING ITEM DOES NOT APPLY TO INHALANTS, PCP, OR HALLUCINOGENS.

During the past year, have you had any withdrawal symptoms, in other words felt sick when you cut down or stopped using (DRUG)**?**

→ IF YES: **What symptoms did you have?** *REFER TO LIST OF WITHDRAWAL SYMPTOMS ON E.28.*

→ *IF NO:* **After not using** (DRUG) **for a few hours or more, did you sometimes use it or something like it to keep yourself from getting sick with** (WITHDRAWAL SXS)?

11. Withdrawal, as manifested by either of the following:

a. The characteristic withdrawal syndrome for the substance (see page E.28).

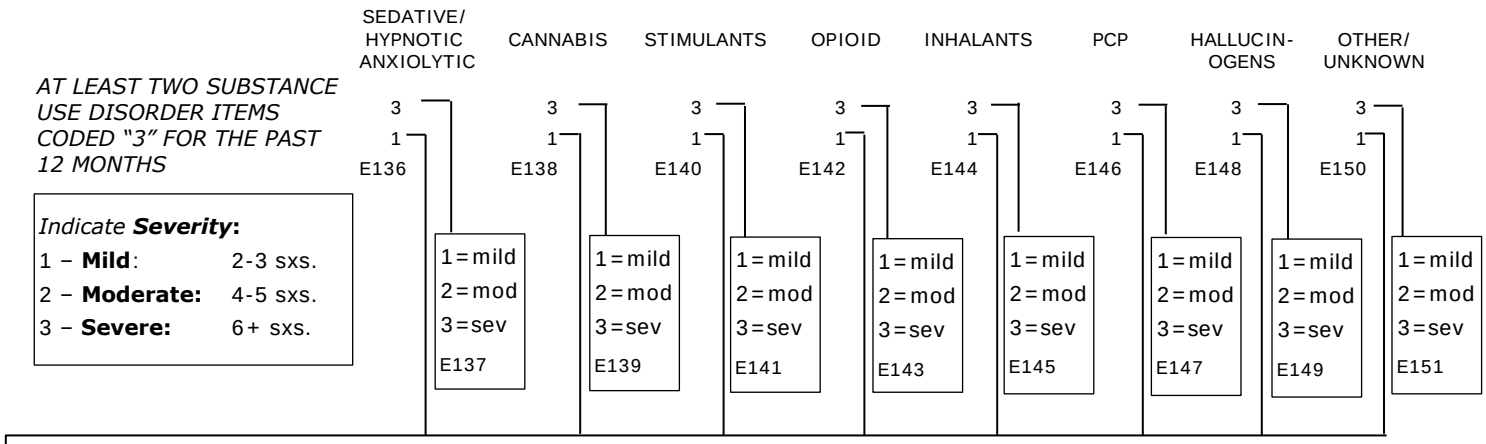
b. The same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms

Note: This criterion does not apply to inhalants, PCP, or hallucinogens.

Note: If opioids, sedatives/hypnotics/anxiolytics medications, or stimulant medications are taken solely under appropriate medical supervision, this criterion is not considered to be met.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	OTHER/ UNKNOWN
3	3	3	3	3
2	2	2	2	2
1	1	1	1	1
?	?	?	?	?
E131	E132	E133	E134	E135

PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER CODING



IF SELECTED OPTION #1 (MOST PROBLEMATIC SUBSTANCE):

IF THERE IS EVIDENCE OF CLINICALLY SIGNIFICANT USE OF ANOTHER DRUG CLASS IN PAST 12 MONTHS (OTHER THAN THOSE ALREADY ASSESSED), GO BACK TO E.11 AND RE-ASSESS CRITERIA FOR THAT DRUG CLASS. OTHERWISE, GO TO ****PRIOR-TO-PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER**** *E.26.*

IF SELECTED OPTION #2 (THREE MOST HEAVILY USED) OR OPTION #3 (ALL DRUG CLASSES AT USE THRESHOLD):

IF NO DRUG CLASSES CODED "3" (I.E., NO CURRENT [PAST YEAR] SUBSTANCE USE DISORDER), GO TO ****PRIOR-TO-PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER**** *E.26.*

INDICATE SPECIFIC NAME(S) OF SUBSTANCE(S) FOR WHICH CRITERIA WERE MET (I.E., CODED "3" ABOVE):

Sedatives, Hypnotics, or Anxiolytics _____ E152

Cannabis _____ E153

Stimulants (including cocaine) _____ E154

Opioids _____ E155

Inhalants _____ E156

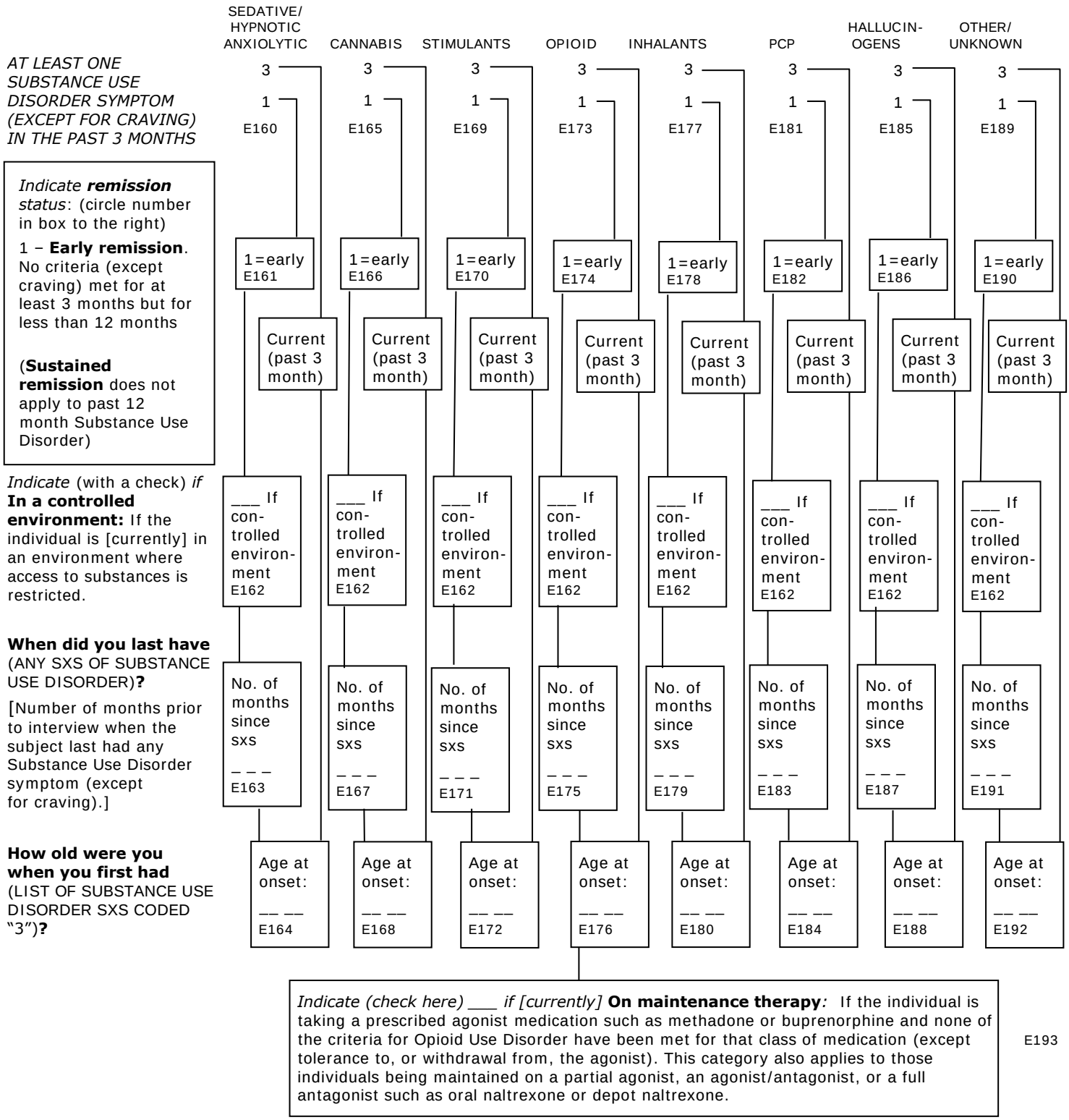
Phencyclidine and Related Substances _____ E157

Hallucinogens _____ E158

Other or Unknown _____ E159

?=Inadequate information 1=Absent or false 2=Subthreshold 3=Threshold or true

PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE CHRONOLOGY



PRIOR-TO-PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER

FOR DRUG CLASSES USED PRIOR TO THE PAST 12 MONTHS DURING THE SUBJECT'S LIFETIME AND FOR WHICH CRITERIA ARE NOT ALREADY MET IN THE PAST 12 MONTHS FOR SUBSTANCE USE DISORDER (I.E., NOT CODED "3" ON PAGE E.17), CODE "3" FOR EACH DRUG CLASS BELOW BASED ON CODING IN THE MIDDLE COLUMN OF OVERVIEW DRUG ASSESSMENT (PATIENT OVERVIEW PAGES 7–8 OR NON-PATIENT OVERVIEW PAGES 5-6). OTHERWISE CODE "1."

NOTE: IF AN ASSESSMENT OF THE SEVERITY OF ALL NON-ALCOHOL SUBSTANCE USE DISORDERS PRIOR TO THE PAST 12 MONTHS IS NEEDED, IGNORE ABOVE INSTRUCTION TO CODE "3" ONLY FOR DRUG CLASSES FOR WHICH CRITERIA ARE NOT ALREADY CURRENT MET, I.E., CODE "3" FOR EACH DRUG CLASS BASED ON CODING IN MIDDLE COLUMN FOR ALL DRUG CLASSES.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
1	1	1	1	1	1	1	1
E194	E195	E196	E197	E198	E199	E200	E201

IF ALL OF THE ABOVE DRUG CLASSES ARE CODED "1," CHECK HERE ___ AND GO TO NEXT MODULE. E202

FOR ALL CLASSES CODED "3" ABOVE, CIRCLE THE APPROPRIATE COLUMN HEADERS (DRUG CLASS NAMES) ON PAGES E.20 TO E.25, BASED ON ONE OF THE FOLLOWING OPTIONS: (*Indicate option used with a check mark in front of option.)*

___ OPTION #1: DETERMINE THE LIFETIME PRESENCE OF SUBSTANCE USE DISORDER (SINGLE MOST PROBLEMATIC SUBSTANCE): E203

Which drug or medication caused you the most problems? Which one did you use the most? (Which was your "drug of choice?")

START WITH THE DRUG CLASS THAT WAS MOST PROBLEMATIC OR USED THE MOST. RETURN HERE IF CRITERIA ARE NOT MET FOR INITIAL DRUG CLASS AND THERE IS ALSO EVIDENCE OF CLINICALLY SIGNIFICANT USE OF OTHER DRUG CLASSES. ASK ABOUT EACH DRUG CLASS IN SEQUENCE UNTIL EITHER THE CRITERIA ARE MET FOR A SUBSTANCE USE DISORDER OR ELSE NONE OF THE DRUG CLASSES MEET CRTERIA.

***___ OPTION #2: DETERMINE LIFETIME PRESENCE OF THE THREE SUBSTANCE CLASSES MOST HEAVILY USED OR MOST PROBLEMATIC**:* E204

Which drugs or medications caused you the most problems? Which ones did you use the most? (Which were your "drugs of choice?")

___ OPTION #3: DETERMINE LIFETIME PRESENCE OF SUBSTANCE USE DISORDER FOR ALL DRUG CLASSES ABOVE SCREENING THRESHOLD. E205

FOR EACH DRUG CLASS CIRCLED IN COLUMN HEADERS: **Looking back over your life, if you had to pick a 12-month period when you used** (CIRCLED DRUG CLASS) **the most or during which your use of** (CIRCLED DRUG CLASS) **caused you the most problems, when would that be?**

NOTE: For the ratings below, "Month/Year" refers to the beginning of the selected 12-month period.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
Month/Year	Month/Year	Month/Year	Month/Year	Month/Year	Month/Year	Month/Year	Month/Year
___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
E206	E207	E208	E209	E210	E211	E212	E213

NON-ALCOHOL SUBSTANCE USE DISORDER CRITERIA

Now I'd like to ask you some more questions about your use of (CIRCLED DRUG CLASSES) **during** (12-MONTH PERIODS SELECTED ABOVE)**.**

A. A problematic pattern of substance use leading to clinically significant impairment or distress, as manifested by at least two of the following occurring within a 12-month period:

FOR EACH CRITERION, ASK QUESTIONS FOR CIRCLED DRUG CLASS(ES) ONLY:

Have you ever found that once you started using (DRUG) **you ended up using much more than you intended to? For example, you planned to have** (SMALL AMOUNT OF DRUG) **but you ended up having much more. (Tell me about that. How often did that happen?)**

IF NO: **What about using** (DRUG) **for a much longer period of time than you were intending to?**

1. The substance is often taken in larger amounts OR over a longer period than was intended.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E214	E215	E216	E217	E218	E219	E220	E221

During (12-MONTH PERIOD) **did you want to stop or cut down using** (DRUG)**, or control your use of** (DRUG)**?**

→ *IF YES:* **How long did this desire to stop, cut down, or control your use of** (DRUG) **last?**

→ *IF NO:* **Did you try to cut down, stop, or control your use of** (DRUG)**? How successful were you? (Did you make more than one attempt to stop, cut down, or control your use of** [DRUG]**?)**

2. There is a persistent desire OR unsuccessful efforts to cut down or control substance use.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E222	E223	E224	E225	E226	E227	E228	E229

During (12-MONTH PERIOD)**, did you spend a lot of time getting** (DRUG) **or using** (DRUG) **or has it taken a lot of time for you to get over the effects of** (DRUG)**? (How much time?)**

3. A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E230	E231	E232	E233	E234	E235	E236	E237

During (12-MONTH PERIOD)**, did you have a strong desire or urge to use** (DRUG) **in between those times when you were using** (DRUG)**? (Was there a time when you had such strong urges to use** [DRUG] **that you had trouble thinking about anything else?)**

IF NO: **How about having a strong desire or urge to use** (DRUG) **when you were around people with whom you used** (DRUG)**?**

4. Craving, or a strong desire or urge to use the substance.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E238	E239	E240	E241	E242	E243	E244	E245

During (12-MONTH PERIOD)**, did you ever miss work or school or often arrived late because you were intoxicated, high, or recovering from the night before?**

IF NO: **How about doing a bad job at work or school, or failing courses or flunking out of school because of your use of** (DRUG)**?**

IF NO: **How about getting into trouble at work or school because of your use of** (DRUG)**?**

IF NO: **How about not taking care of things at home because of your use of** (DRUG)**, like making sure there is food and clean clothes for your family and making sure your children go to school and get medical care? How about not paying your bills?**

IF YES TO ANY: **How often?**

5. Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home [(e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E246	E247	E248	E249	E250	E251	E252	E253

During (12-MONTH PERIOD)**, did your use of** (DRUG) **cause problems with other people, such as with family members, friends, or people at work? (Did you find yourself regularly getting into arguments about your** [DRUG] **use? Did you get into physical fights when you were taking** [DRUG]**?)**

IF YES: **Did you keep on using** (DRUG) **anyway?**

6. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance [(e.g., arguments with spouse about consequences of intoxication, physical fights)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E254	E255	E256	E257	E258	E259	E260	E261

During (12-MONTH PERIOD)**, did you give up or reduce the time you spent at work or school, with family or friends, or on your hobbies because you were using** (DRUG) **instead?**

7. Important social, occupational, or recreational activities given up or reduced because of substance use.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E262	E263	E264	E265	E266	E267	E268	E269

During (12-MONTH PERIOD)**, did you ever use** (DRUG) **before doing something that required coordination and concentration like driving, boating, climbing on a ladder, or operating heavy machinery?**

IF YES: (FOR SUBSTANCES OTHER THAN STIMULANTS): **Would you say that your use of** (DRUG) **affected your coordination or concentration so that it was more likely that you or someone else could have been hurt?**

IF YES: (FOR STIMULANTS ONLY): **Would you say that your being high on** (STIMULANTS) **made you drive recklessly like driving very fast or taking unnecessary risks?**

IF YES TO EITHER AND UNKNOWN: **How many times? (When did this happen?)**

8. Recurrent substance use in situations in which it is physically hazardous [(e.g., driving an automobile or operating a machine when impaired by substance use)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E270	E271	E272	E273	E274	E275	E276	E277

During (12-MONTH PERIOD)**, did your use of** (DRUG) **cause you any problems like making you very depressed, irritable, anxious, paranoid, or extremely agitated? What about triggering panic attacks, making it difficult for you to fall or stay asleep, putting you into a "mental fog," or making it so you couldn't recall what happened while you were using** (DRUG)**?**

Did your use of (DRUG) **cause physical problems, like heart palpitations, coughing or trouble breathing, constipation, or skin infections?**

IF YES TO EITHER OF ABOVE: **Did you keep on using** (DRUG) **anyway?**

9. Substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance [(e.g., recurrent cocaine use despite recognition of cocaine-related depression)].

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E278	E279	E280	E281	E282	E283	E284	E285

During (12-MONTH PERIOD)**, did you need to use much more** (DRUG) **in order to get the feeling you wanted than when you first started using it?**

→ *IF YES:* **How much more?**

→ *IF NO:* **What about finding that when you used the same amount, it had much less effect than before?**

IF PRESCRIBED MEDICATION: **Were you taking** (DRUG) **exactly as your doctor told you to? (Did you ever take more of it than was prescribed or run out of your prescription early? Did you ever go to more than one doctor in order to get the amount of medication you wanted?)**

10. Tolerance, as defined by either of the following:

a. A need for markedly increased amounts of the substance to achieve intoxication or desired effect.

b. Markedly diminished effect with continued use of the same amount of the substance.

Note: If opioids, sedative/hypnotics/anxiolytics medications, or stimulant medications are taken solely under appropriate medical supervision, this criterion is not considered to be met.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1
?	?	?	?	?	?	?	?
E286	E287	E288	E289	E290	E291	E292	E293

THE FOLLOWING ITEM DOES NOT APPLY TO INHALANTS, PCP,OR HALLUCINOGENS.

During (12-MONTH PERIOD)**, did you ever have any withdrawal symptoms, in other words felt sick when you cut down or stopped using** (DRUG)**?**

→ *IF YES:* **What symptoms did you have?** *REFER TO LIST OF WITHDRAWAL SYMPTOMS ON E.*28*.*

→ *IF NO:* **After not using** (DRUG) **for a few hours or more, did you sometimes use it or something like it to keep yourself from getting sick with** (WITHDRAWAL SYMPTOMS)**?**

11. Withdrawal, as manifested by either of the following:

a. The characteristic withdrawal syndrome for the substance (see page E.28).

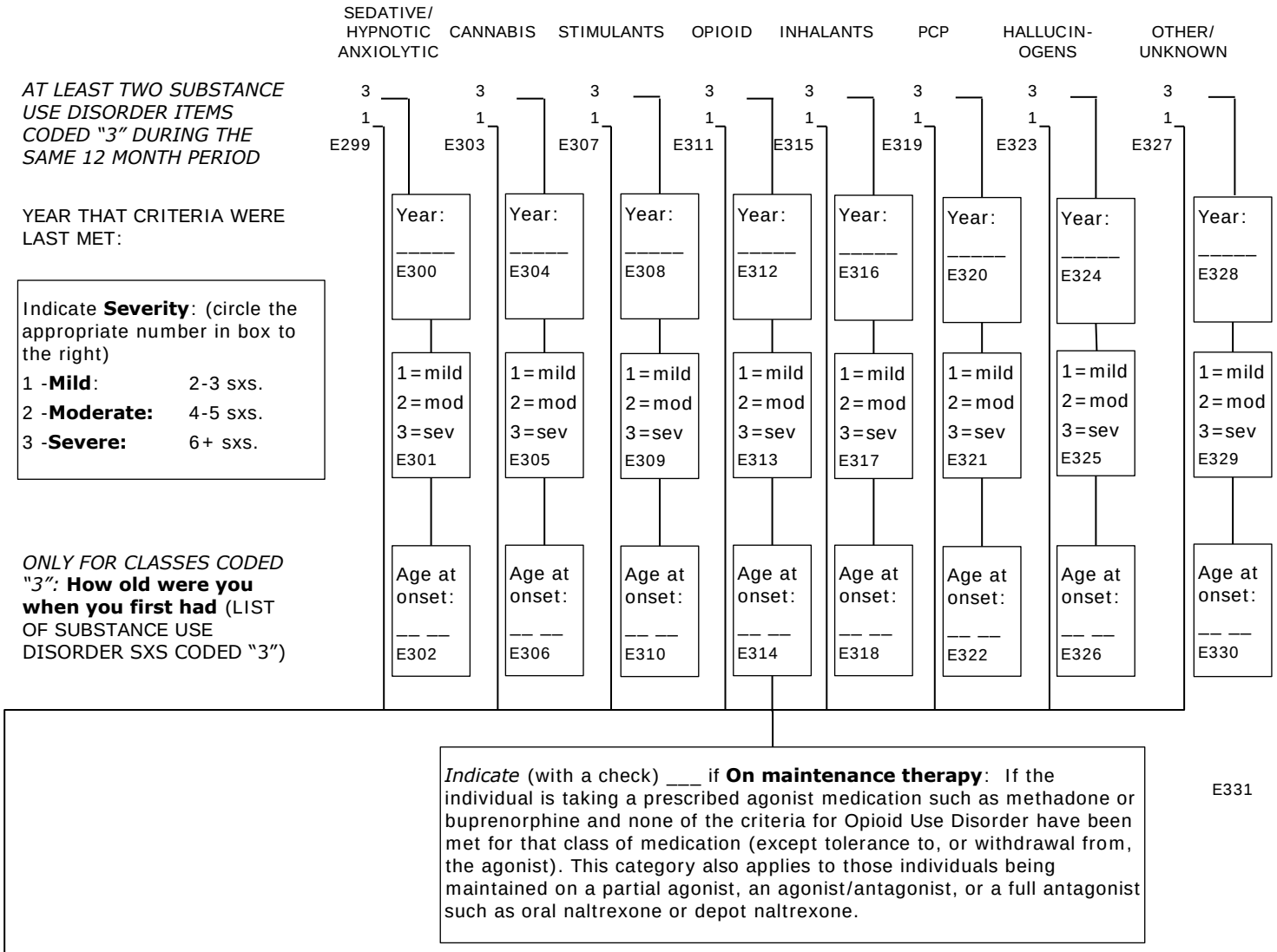
b. The same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms

Note: This criterion does not apply to inhalants, PCP, or hallucinogens.

Note: If opioids, sedative/hypnotics/anxiolytic medications, or stimulant medications are taken solely under appropriate medical supervision, this criterion is not considered to be met.

SEDATIVE/ HYPNOTIC/ANX	CANNABIS	STIMULANTS	OPIOID	OTHER/ UNKNOWN
3	3	3	3	3
2	2	2	2	2
1	1	1	1	1
?	?	?	?	?
E294	E295	E296	E297	E298

PRIOR-TO-PAST-12-MONTH NON-ALCOHOL SUBSTANCE USE DISORDER CODING



IF SELECTED OPTION #1 (MOST PROBLEMATIC SUBSTANCE):

IF THERE IS EVIDENCE OF CLINICALLY SIGNIFICANT USE OF ANOTHER DRUG CLASS PRIOR TO THE PAST 12 MONTHS (OTHER THAN THOSE ALREADY ASSESSED), GO BACK TO E.20 AND RE-ASSESS CRITERIA FOR THAT DRUG CLASS. OTHERWISE, GO TO NEXT PAGE TO RECORD SPECIFIC NAMES OF SUBSTANCES AND REMISSION STATUS.

IF SELECTED OPTION #2 (THREE MOST HEAVILY USED) OR OPTION #3 (ALL DRUG CLASSES AT USE THRESHOLD):

IF NO DRUG CLASSES CODED "3" (I.E., NO SUBSTANCE USE DISORDER PRIOR TO PAST 12 MONTHS), GO TO THE NEXT PAGE TO RECORD SPECIFIC NAMES OF SUBSTANCES AND REMISSION STATUS.

INDICATE SPECIFIC NAME(S) OF SUBSTANCE(S) FOR WHICH CRITERIA WERE MET PRIOR TO PAST 12 MONTHS (I.E., CODED "3" ABOVE):

Sedatives, Hypnotics, or Anxiolytics _____ E332

Cannabis _____ E333

Stimulants (including cocaine) _____ E334

Opioids _____ E335

Inhalants _____ E336

Phencyclidineand Related Substances _____ E337

Hallucinogens _____ E338

Other and Unknown _____ E339

Indicate ___ if **In a controlled environment***: If the individual is [currently] in an environment where access to substances is restricted.* E340

Indicate current remission status: (circle the appropriate number)	SEDATIVE/ HYPNOTIC ANXIOLYTIC	CANNABIS	STIMULANTS	OPIOID	INHALANTS	PCP	HALLUCINOGENS	OTHER/ UNKNOWN
0 – **Not in remission** (i.e., one Substance Use criterion has been present in the past 12 months)	0	0	0	0	0	0	0	0
2 – **In sustained remission:** After full criteria for Substance Use Disorder were previously met, none of the criteria for Substance Use Disorder have been met at any time during the past 12 months or longer (with the exception that Criterion A.4, "Craving, or a strong desire or urge to use substance," may be met).	2	2	2	2	2	2	2	2
	E341	E342	E343	E344	E345	E346	E347	E348

LIST OF WITHDRAWAL SYMPTOMS (FROM DSM-5 CRITERIA)

Listed below are the characteristic withdrawal syndromes for those classes of psychoactive substances for which a withdrawal syndrome has been identified. (NOTE: A specific withdrawal syndrome has not been identified for PCP, HALLUCINOGENS, OR INHALANTS). Withdrawal symptoms may occur following the cessation of prolonged moderate or heavy use of a psychoactive substance or a reduction in the amount used.

SEDATIVES, HYPNOTICS, AND ANXIOLYTICS:

Two (or more) of the following, developing within several hours to a few days after cessation of (or reduction in) sedative, hypnotic, or anxiolytic use, that has been prolonged:

1. Autonomic hyperactivity (e.g., sweating or pulse rate greater than 100 bpm).
2. Hand tremor.
3. Insomnia.
4. Nausea or vomiting.
5. Transient visual, tactile, or auditory hallucinations or illusions.
6. Psychomotor agitation.
7. Anxiety.
8. Grand mal seizures.

CANNABIS:

Three (or more) of the following signs and symptoms developing within approximately one week after cessation of cannabis use that has been heavy and prolonged (i.e., usually daily or almost daily use over a period of at least a few months):

1. Irritability, anger, or aggression.
2. Nervousness or anxiety.
3. Sleep difficulty (e.g., insomnia, disturbing dreams).
4. Decreased appetite or weight loss.
5. Restlessness.
6. Depressed mood.
7. At least one of the following physical symptoms causing significant discomfort: abdominal pain, shakiness/tremors, sweating, fever, chills, or headache.

STIMULANTS/COCAINE:

Dysphoric mood AND two (or more) of the following physiological changes, developing within a few hours to several days after cessation of (or reduction in) prolonged amphetamine-type substance, cocaine, or other stimulant use:

1. Fatigue.
2. Vivid, unpleasant dreams.
3. Insomnia or hypersomnia.
4. Increased appetite.
5. Psychomotor retardation or agitation.

OPIOIDS:

Three (or more) of the following, developing within minutes to several days after cessation of (or reduction in) opioid use that has been heavy and prolonged (i.e., several weeks or longer) or after administration of an opioid antagonist after a period of opioid use:

1. Dysphoric mood.
2. Nausea or vomiting.
3. Muscle aches.
4. Lacrimation or rhinorrhea (runny nose)
5. Pupillary dilation, piloerection ("goose bumps"), or sweating.
6. Diarrhea.
7. Yawning.
8. Fever.
9. Insomnia.

F. ANXIETY DISORDERS

PANIC DISORDER

PANIC DISORDER CRITERIA

*IF SCREENING QUESTION #1 ANSWERED "NO," SKIP TO ***AGORAPHOBIA*** F.8.*

IF QUESTION #1 ANSWERED "YES": **You've said that you have had an intense rush of anxiety, or what someone might call a "panic attack," when you <u>suddenly</u> felt very frightened, or anxious or <u>suddenly</u> developed a lot of physical symptoms.**

IF SCREENER NOT USED: **Have you ever had an intense rush of anxiety, or what someone might call a "panic attack," when you <u>suddenly</u> felt very frightened, or anxious or <u>suddenly</u> developed a lot of physical symptoms?**

Tell me about that.

When was the last bad one?

What was it like? How did it begin?

SCREEN Q#1 **YES** | **NO** F1

GO TO ***AGORA-PHOBIA*** F.8

IF UNKNOWN: **Did the symptoms come on suddenly?**

IF YES: **How long did it take from when it began to when it got really bad? (Did it happen within a few minutes?)**

A panic attack is an abrupt surge of intense fear or intense discomfort that reaches a peak within minutes.

Note: The abrupt surge can occur from a calm state or an anxious state.

? 1 2 3 F2

During that attack...

...did your heart race, pound or skip?	1. Palpitations, pounding heart, or accelerated heart rate.	?	1	2	3	F3
...did you sweat?	2. Sweating.	?	1	2	3	F4
...did you tremble or shake?	3. Trembling or shaking.	?	1	2	3	F5
...were you short of breath? (Have trouble catching your breath? Feel like you were being smothered?)	4. Sensations of shortness of breath or smothering.	?	1	2	3	F6
...did you feel as if you were choking?	5. Feelings of choking.	?	1	2	3	F7
...did you have chest pain or pressure?	6. Chest pain or discomfort.	?	1	2	3	F8
...did you have nausea or upset stomach or the feeling that you were going to have diarrhea?	7. Nausea or abdominal distress.	?	1	2	3	F9
...did you feel dizzy, unsteady, or like you might faint?	8. Feeling dizzy, unsteady, lightheaded or faint.	?	1	2	3	F10
...did you have flushes, hot flashes, or chills?	9. Chills or heat sensations.	?	1	2	3	F11

?=Inadequate information 1=Absent or false 2=Subthreshold 3=Threshold or true

During that attack...

...did you have tingling or numbness in parts of your body?	10. Paresthesias (numbness or tingling sensations)	?	1	2	3	F12
...did you have the feeling that you were detached from your body or mind, that time was moving slowly, or that you were an outside observer of your own thoughts or movements? *IF NO:* **How about feeling that everything around you was unreal or that you were in a dream?**	11. Derealization (feelings of unreality) or depersonalization (being detached from oneself).	?	1	2	3	F13
...were you afraid you were going crazy or might lose control?	12. Fear of losing control or "going crazy."	?	1	2	3	F14
...were you afraid that you were dying?	13. Fear of dying.	?	1	2	3	F15
	AT LEAST FOUR ITEMS CODED "3" AND REACHED THEIR PEAK WITHIN MINUTES		1		3	F16

→ PANIC ATTACK; CONTINUE WITH NEXT ITEM

Besides the one you just described, have you had any other attacks which had even more of the symptoms that I just asked you about?

→ IF YES, GO BACK TO PAGE F.1 AND ASSESS THE SYMPTOMS OF THAT ATTACK.

→ IF NO: GO TO ***AGORAPHOBIA*** F.8

Have any of these attacks ever come on out of the blue—in situations where you didn't expect to be nervous or uncomfortable?

→ *IF YES:* **What was going on when the attack(s) happened? (What were you doing at the time? Were you already nervous or anxious at the time or rather were you relatively calm or relaxed?)**

→ *IF NO:* **How about the very first one you had. What were you doing at the time? (Were you already nervous or anxious at the time or rather were you relatively calm or relaxed?)**

IF ATTACK IS UNEXPECTED: **How many of these kinds of attacks have you had? (At least two?)**

A. Recurrent unexpected panic attacks. ? 1 2 3 F17

→ GO TO ***EXPECTED PANIC ATTACKS*** F.7

→ CONTINUE ON NEXT PAGE

?=Inadequate information 1=Absent or false 2=Subthreshold 3=Threshold or true

After any of these attacks...

B. At least one of the attacks has been followed by 1 month (or more) of one or both of the following:

...were you concerned or worried that you might have another attack or worried that you would feel like you were having a heart attack again, or worried that you would lose control or go crazy?

IF YES: **How long did that concern or worry last? (Did it last at least a month? Nearly every day?)**

1. Persistent concern or worry about additional attacks or their consequences (e.g., losing control, having a heart attack, "going crazy"). ? 1 2 3 F18

...did you do anything differently because of the attacks (like avoiding certain places or not going out alone)? (What about avoiding certain activities like exercise? What about things like always making sure you're near a bathroom or exit?)

IF YES: **How long did that last? (As long as a month?)**

2. A significant maladaptive change in behavior related to the attacks (e.g., behaviors designed to avoid having panic attacks, such as avoidance of exercise or unfamiliar situations). ? 1 2 3 F19

CRITERION B.1 OR B.2 CODED "3" 1 3 F20

GO TO ***AGORA-PHOBIA*** F.8

IF UNKNOWN: **When did your panic attacks start?**

Just before you began having panic attacks, were you taking any drugs, caffeine, diet pills, or other medicines?

(How much coffee, tea, or caffeinated beverages do you drink a day?)

Just before the attacks, were you physically ill?

IF YES: **What did the doctor say?**

C. [Primary Anxiety Disorder:] The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g. hyperthyroidism, cardiopulmonary disorders).

IF THERE IS ANY INDICATION THAT PANIC ATTACKS MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF A GMC OR SUBSTANCE/MEDICATION), GO TO ***GMC/SUBSTANCE*** F.33, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

Etiological medical conditions include: endocrine disease (e.g., hyperthyroidism, pheochromocytoma, hypoglycemia, hyperadrenocortisolism), cardiovascular disorders (e.g., congestive heart failure, pulmonary embolism, arrhythmia such as atrial fibrillation), respiratory illness (e.g., chronic obstructive pulmonary disease, asthma, pneumonia), metabolic disturbances (e.g., vitamin B_{12} deficiency, porphyria), and neurological illness (e.g., neoplasms, vestibular dysfunction, encephalitis, seizure disorders).

Etiological substances/medications include: alcohol (I/W), caffeine (I), cannabis (I), opioids (W), phencyclidine (I), other hallucinogens (I), inhalants, and stimulants (including cocaine) (I/W), sedatives, hypnotics, and anxiolytics (W); anesthetics and analgesics, sympathomimetics or other bronchodilators, anticholinergics, insulin, thyroid preparations, oral contraceptives, antihistamines, antiparkinsonian medications, corticosteroids, antihypertensive and cardiovascular medications, anticonvulsants, lithium carbonate, antipsychotic medications, antidepressant medications, and exposure to heavy metals and toxins such as organophosphate insecticide, nerve gases, carbon monoxide, carbon dioxide, volatile substances such as gasoline and paint.

? 1 3 F21

? → ALL DUE TO SUBSTANCE USE OR GMC GO TO ***AGORA-PHOBIA*** F.8

1 → PRIMARY ANXIETY DISORDER

3 → CONTINUE WITH NEXT ITEM

IF NECESSARY, RETURN TO THIS ITEM AFTER COMPLETING MODULES FOR OC AND RELATED DISORDERS AND TRAUMA- AND STRESS-RELATED DISORDERS.

D. The disturbance is not better explained by another mental disorder (e.g., the panic attacks do not occur only in response to feared social situations, as in Social Anxiety Disorder; in response to circumscribed phobic objects or situations, as in Specific Phobia; in response to obsessions, as in Obsessive-Compulsive Disorder; in response to reminders of traumatic events, as in Posttraumatic Stress Disorder; or in response to separation from attachment figures, as in Separation Anxiety Disorder).

? 1 3 F22

? / 1 → GO TO ***AGORA-PHOBIA*** F.8

A, B, C, AND D ARE CODED "3." ? 1 3 F23

GO TO ***AGORA-PHOBIA*** F.8

LIFETIME PANIC DIS ORDER

PANIC DISORDER CHRONOLOGY

NOTE: IF LIFETIME ASSESSMENT ALREADY SUGGESTS THE PRESENCE OF PANIC ATTACKS DURING THE CURRENT MONTH, ASK THE FOLLOWING QUESTIONS ONLY IF NEEDED.

Since (1 MONTH AGO) **how many panic attacks have you had?**

A. Recurrent panic attacks (unexpected or expected) [in past month]. ? 1 3 F24

GO TO ***PAST PANIC DISORDER*** F.6

In the past month...

B. [During the past month,] at least one of the attacks has been followed by 1 month (or more) of one or both of the following:

...have you been concerned or worried that you might have another attack or worried that you would feel like you were having a heart attack again, or worried that you would lose control or go crazy?

IF YES: **Did you feel that way for most of the time since** (1 MONTH AGO)**?**

1. Persistent concern or worry about additional attacks or their consequences (e.g., losing control, having a heart attack, "going crazy"). ? 1 2 3 F25

...have you done anything differently because of the attacks (like avoiding certain places or not going out alone)? (What about avoiding certain activities like exercise? What about things like always making sure you're near a bathroom or exit?)

IF YES: **Did you feel that way for most of the time since** (1 MONTH AGO)**?**

2. A significant maladaptive change in behavior related to the attacks; (e.g., behaviors designed to avoid having panic attacks, such as avoidance of exercise or unfamiliar situations). ? 1 2 3 F26

CURRENT PANIC DISORDER

CRITERIA A AND B.1 OR B.2 CODED "3" FOR PAST MONTH. ? 1 3 F27

GO TO ***PAST PANIC DISOR-DER*** F.6

CURRENT PANIC DISORDER

IF UNKNOWN: **How old were you when you first started having panic attacks?**

Age at onset of Panic Disorder (CODE 99 IF UNKNOWN). ___ ____ F28

GO TO ***AGORA-PHOBIA*** F.8

PAST PANIC DISORDER

When did you last have (ANY SXS OF PANIC DISORDER)**?**	Number of months prior to interview when last had a symptom of Panic Disorder	____ ____ ____	F29
IF UNKNOWN: **How old were you when you first started having panic attacks?**	Age at onset of Panic Disorder (CODE 99 IF UNKNOWN).	____ ____	F30

GO TO ***AGORA-PHOBIA*** F.8

EXPECTED PANIC ATTACKS

*IF THERE HAS BEEN ONLY A SINGLE UNEXPECTED PANIC ATTACK, GO TO ***AGORAPHOBIA,*** F.8 (CONTINUE ON THE NEXT PAGE).*

In what kinds of situations did you have the attack(s)?

.... for example, did they occur when you were already anxious about something, like a social situation, or when you had to face something that you were afraid of?

Were you (depressed/OWN WORDS**) at the time?**

Were you (high/irritable/OWN WORDS**) at the time?**

Were you drinking or taking any drugs or medications?

Were you physically ill?

RECORDING OF DIAGNOSTIC CONTEXT FOR PANIC ATTACK SPECIFIER

Indicate **types of situations** during which attack(s) occurred: (Check all that apply; page numbers indicate where "With panic attacks" specifier is coded):

___ Depressive thoughts (in MDD, page D.18, in Bipolar Disorder, in context of Major Depressive Episode, page D.16, and Persistent Depressive Disorder, page A.32) F31

___ Manic or hypomanic symptoms (in context of Manic Episode, pages D.15, in context of hypomanic episode, page D.16) F32

___ Social situations (in Social Anxiety Disorder, page F.17) F33

___ Phobic situations (in Specific Phobia, page F.22) F34

___ Chronic generalized anxiety and worry (in current GAD page F.26) F35

___ Separation from attachment figures (in Separation Anxiety Disorder, page Opt-F.4) F36

___ Due to a substance/medication (in Substance-induced Anxiety Disorder, F.36) F37

___ Due to another medical condition (in Anxiety Disorder due to AMC), F.34) F38

___ Obsession/compulsion-related (in OCD, page G.6) F39

___ Hoarding-related (in Hoarding, page Opt-G.5) F40

___ Body Dysmorphic-Disorder-related (in BDD, page Opt-G.9) F41

___ Exposure to reminder of trauma (in Acute Stress Disorder, page L.10; in PTSD, page L.19) F42

Refer to back the above list of situations when coding the "With panic attacks" specifier included in the assessment of the respective disorders (page numbers indicate the page on which the panic attacks specifier is coded).

GO TO ***AGORA-PHOBIA*** F.8 (CONTINUE ON THE NEXT PAGE)

AGORAPHOBIA

→ *IF SCREENING QUESTION #2 ANSWERED "NO," SKIP TO ***SOCIAL ANXIETY DISORDER*** F.14*

→ *IF QUESTION #2 ANSWERED "YES":* **You've said that you have been very anxious or afraid of situations like going out of the house alone, being in crowds, going to stores, standing in lines, or traveling on buses or trains.**

→ *IF SCREENER NOT USED:* **Have you ever been very anxious about or afraid of situations like going out of the house alone, being in crowds, going to stores, standing in lines, or traveling on buses or trains?**

Tell me about the situations that you've been afraid of.

IF UNKNOWN: **Have you been afraid of, or anxious about, travelling in taxi cabs, buses, trains, ships or planes?**

IF UNKNOWN: **How about being in open spaces, like parking lots, outdoor marketplaces, or bridges?**

IF UNKNOWN: **How about being in enclosed places like stores, movie theaters, or shopping malls?**

IF UNKNOWN: **How about standing in a line or being in a crowd?**

IF UNKNOWN: **How about being outside of the house alone?**

AGORAPHOBIA CRITERIA

SCREEN Q#2 **YES** | | **NO** F43

IF NO: GO TO ***SOCIAL ANXIETY DISORDER*** F.14

A. Marked fear or anxiety about two (or more) of the following five situations:

1. Using public transportation (e.g., [taxi cabs], buses, trains, ships, planes).	?	1	2	3	F44
2. Being in open spaces (e.g., parking lots, marketplaces, bridges).	?	1	2	3	F45
3. Being in enclosed places (e.g., shops, theaters, cinemas).	?	1	2	3	F46
4. Standing in line or being in a crowd.	?	1	2	3	F47
5. Being outside of the home alone.	?	1	2	3	F48
AT LEAST TWO ITEMS ARE CODED "3"		1		3	F49

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

Why did you avoid (SITUATIONS CODED "3") **(What were you afraid would happen?)**

(Were you afraid that it might be hard for you to get out of the situation if you absolutely needed to...like if you suddenly developed a panic attack?)

(Or developing something else that would be embarrassing like losing control of your bladder or bowels or vomiting?)

(Or becoming impaired in some way like by falling or passing out?)

(How about being worried that there would be nobody there to help you in case these kinds of things happened?)

B. The individual fears or avoids these situations because of thoughts that escape might be difficult or help might not be available in the event of developing panic-like symptoms or other incapacitating or embarrassing symptoms (e.g., fear of falling in the elderly, fear of incontinence).

? 1 2 3 F50

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

Have you almost always felt frightened or anxious when you were in (SITUATIONS CODED "3" ABOVE)**?**

C. The agoraphobic situations almost always provoke fear or anxiety.

? 1 2 3 F51

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

Have you gone out of your way to avoid these situations?

IF NO: **Have you been only able to go into one of these situations if you were with someone you knew?**

IF NO: **When you have had to be in one of these situations, have you felt intensely afraid or anxious?**

D. The agoraphobic situations are actively avoided, require the presence of a companion, or are endured with intense fear or anxiety.

? 1 2 3 F52

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

IF UNKNOWN: **Have you felt any danger or threat to your safety when you were in** (SITUATIONS CODED "3" ABOVE)? **(Tell me about that.)**

E. The fear or anxiety is out of proportion to the actual danger posed by the agoraphobic situations and the sociocultural context.

NOTE: Code "3" if situations do not pose danger or if fear or anxiety is out of proportion to actual danger or sociocultural context.

? 1 2 3 F53

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

How long have you been afraid of or avoided (SITUATIONS CODED "3")**? (At least 6 months?)**

F. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.

? 1 2 3 F54

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

IF UNKNOWN: **What effect have** (AGORAPHOBIC SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION G:

How have (AGORAPHOBIC SXS) **affected your relationships or your interactions with other people? (Have they caused any problems in your relationships with your family, romantic partner or friends?)**

How have (AGORAPHOBIC SXS) **affected your ability to work, take care of your family or household needs, or be involved in things that are important to you like religious activities, physical exercise, or hobbies?**

Have (AGORAPHOBIC SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH FUNCTIONING: **How much have you been bothered or upset by having** (AGORAPHOBIC SXS)**?**

G. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 F55

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

IF A GENERAL MEDICAL CONDITION CHARACTERIZED BY INCAPACITATING SYMPTOMS IS PRESENT: **Is your avoidance of** (SITUATION) **related to your** (MEDICAL CONDITION)? **(Tell me about it. How often has** [INCAPACITATING SYMPTOM] **actually happened in** [AVOIDED SITUATION]**?)**

H. If another medical condition (e.g., inflammatory bowel disease, Parkinson's disease) is present, the fear, anxiety, or avoidance is clearly excessive.

? 1 2 3 F56

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

IF NECESSARY, RETURN TO THIS ITEM AFTER COMPLETING MODULES FOR OC AND RELATED DISORDERS AND TRAUMA- AND STRESS-RELATED DISORDERS.

I. The fear, anxiety, or avoidance is not better explained by the symptoms of another mental disorder—for example, the symptoms are not confined to Specific Phobia, situational type; do not involve only social situations (as in Social Anxiety Disorder); and are not related exclusively to obsessions (as in Obsessive-Compulsive Disorder), perceived defects or flaws in physical appearance (as in Body Dysmorphic Disorder), reminders of traumatic events (as in Posttraumatic Stress Disorder), or fear of separation (as in Separation Anxiety Disorder).

? 1 3 F57

GO TO ***SOCIAL ANXIETY DISORDER*** F.14

NOTE: Consider a diagnosis of Specific Phobia if fear is limited to one or only a few specific situations, or a diagnosis of Social Anxiety Disorder if fear is limited to social situations.

AGORAPHOBIA CRITERIA A, B, C, D, E, F, G, H, AND I ARE CODED "3."

1 3 F58

GO TO ***SOCIAL ANXIETY DIS-ORDER*** F.14

AGORA-PHOBIA

AGORAPHOBIA CHRONOLOGY

NOTE: IF LIFETIME ASSESSMENT ALREDY SUGGESTS THE PRESENCE OF AGORAPHOBIA DURING THE PAST 6 MONTHS, ASK THE FOLLOWING QUESTIONS ONLY IF NEEDED.

Since (6 MONTHS AGO)**, have you ever been very anxious about or afraid of situations like going out of the house alone, being in crowds, going to stores, standing in lines, or traveling on buses or trains?**

A. [During the past 6 months,] marked fear or anxiety about two (or more) situations.

? 1 3 F59

→ GO TO ***PAST AGORAPHOBIA*** F.13

Since (6 MONTHS AGO)**, have you gone out of your way to avoid these situations?**

IF NO: **Have you been only able to go into one of these situations if you are with someone you know?**

IF NO: **When you have had to be in one of these situations, have you felt intensely afraid or anxious?**

D. [During the past 6 months,] the agoraphobic situations are actively avoided, require the presence of a companion, or are endured with intense fear or anxiety.

? 1 3 F60

→ GO TO ***PAST AGORAPHOBIA*** F.13

During the past six months, since (6 MONTHS AGO)**, what effect have** (AGORAPHOBIC SXS) **had on your life?**

IF HAVE NOT INTERFERED WITH FUNCTIONING: **During the past 6 months, since** (6 MONTHS AGO)**, how much have you been bothered or upset by having** (AGORAPHOBIC SXS)**?**

G. [During the past 6 months,] the fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 3 F61

→ GO TO ***PAST AGORAPHOBIA*** F.13

CURRENT AGORAPHOBIA

CRITERIA A, D, AND G CODED "3" FOR PAST 6 MONTHS

1 3 F62

→ GO TO ***PAST AGORAPHOBIA*** F.13

→ CURRENT AGORA-PHOBIA

IF UNKNOWN: **How old were you when you first started having** (SXS OF AGORAPHOBIA)**?**

Age at onset of Agoraphobia (CODE 99 IF UNKNOWN) ____ ____ F63

→ GO TO ***SOCIAL ANXIETY DISORDER*** F.14

PAST AGORAPHOBIA

When did you last have (ANY SXS OF AGORAPHOBIA)**?**	Number of months prior to interview when last had a symptom of Agoraphobia	____ ____ ____	F64
IF UNKNOWN: **How old were you when you first started having** (SXS OF AGORAPHOBIA)?	Age at onset of Agoraphobia (CODE 99 IF UNKNOWN)	____ ____	F65

GO TO ***SOCIAL ANXIETY DISORDER*** F.14 (NEXT PAGE)

SOCIAL ANXIETY DISORDER

SOCIAL ANXIETY DISORDER CRITERIA

*IF SCREENING QUESTIONS #3 AND #4 ARE BOTH ANSWERED "NO," SKIP TO ***SPECIFIC PHOBIA*** F.19.*

SCREEN Q#3 **YES** | | **NO** F66

IF QUESTION #3 ANSWERED "YES": **You've said that you have been especially anxious or afraid in social situations, like having a conversation or meeting unfamiliar people.**

IF QUESTION #4 ANSWERED "YES": **You've [also] said that there are things that you have been afraid or felt very uncomfortable doing in front of other people, like speaking, eating, writing, or using a public bathroom.**

SCREEN Q#4 **YES** | | **NO** F67

IF NO TO BOTH: GO TO ***SPECIFIC PHOBIA*** F.19

IF SCREENER NOT USED: **Have you been especially nervous or anxious in social situations like having a conversation or meeting unfamiliar people?**

IF NO: **Is there anything that you have been afraid to do or felt very uncomfortable doing in front of other people, like speaking, eating, writing, or using a public bathroom?**

IF YES TO ANY OF ABOVE: **Tell me about that. Give me some examples of when this has happened. (Situations like having a conversation, meeting people you don't know, being observed eating, drinking or going to the bathroom or performing in front of others?)**

A. Marked fear or anxiety about one or more social situations in which the person is exposed to possible scrutiny by others. Examples include social interactions (e.g., having a conversation, meeting unfamiliar people), being observed (e.g., eating or drinking), and performing in front of others (e.g., giving a speech).

NOTE: Code "1" if fear or anxiety is limited to public speaking and is within normal limits.

? 1 2 3 F68

GO TO ***SPECIFIC PHOBIA*** F.19

What were you afraid would happen when you were in (SOCIAL OR PERFORMANCE SITUATION)**? (Were you afraid of being embarrassed because of what you might say or how you might act? Were you afraid that this would lead to your being rejected by other people? How about making others uncomfortable or offending them because of what you said or how you acted?)**

B. The individual fears that he or she will act in a way or show anxiety symptoms that will be negatively evaluated (i.e., will be humiliating or embarrassing; will lead to rejection or offend others).

? 1 2 3 F69

GO TO ***SPECIFIC PHOBIA*** F.19

Have you almost always felt frightened when you would be in (FEARED SOCIAL OR PERFORMANCE SITUATIONS)**?**

C. The social situations almost always provoke fear or anxiety.

? 1 2 3 F70

GO TO ***SPECIFIC PHOBIA*** F.19

?=Inadequate information 1=Absent or false 2=Subthreshold 3=Threshold or true

IF UNKNOWN: **Did you go out of your way to avoid** (FEARED SOCIAL OR PERFORMANCE SITUATIONS)**?**

IF NO: **How hard was it for you to be in** (FEARED SOCIAL SITUATION)**?**

D. The social situations are avoided or endured with intense fear or anxiety.

? 1 2 3 F71

GO TO ***SPECIFIC PHOBIA*** F.19

IF UNKNOWN: **What would you say would be the likely outcome of** (PERFORMING POORLY IN SOCIAL SITUATIONS)**? (Were these situations actually dangerous in some way, like avoiding being bullied or tormented by someone?)**

E. The fear or anxiety is out of proportion to the actual threat posed by the social situation and to the sociocultural context.

NOTE: Code "3" if no threat posed by social situation or if out of proportion to actual threat or sociocultural context.

? 1 2 3 F72

GO TO ***SPECIFIC PHOBIA*** F.19

IF UNCLEAR: **How long have** (SXS OF SOCIAL ANXIETY DISORDER) **lasted? (Have they lasted for at least 6 months or more?)**

F. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.

? 1 2 3 F73

GO TO ***SPECIFIC PHOBIA*** F.19

IF UNKNOWN: **What effect have** (SOCIAL ANXIETY SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION G:

How have (SOCIAL ANXIETY SXS) **affected your ability to have friends or meet new people? (How about dating?) How have** (SOCIAL ANXIETY SXS) **affected your interactions with other people, especially unfamiliar people?**

How have (SOCIAL ANXIETY SXS) **affected your ability to do things at school or at work that require interacting with other people? (How about making presentations or giving talks?)**

Have you avoided going to school or to work if you think you will be put in a situation which makes your uncomfortable?

How have (SOCIAL ANXIETY SXS) **affected your ability to work, take care of your family or household needs, or be involved in things that are important to you like religious activities, physical exercise, or hobbies?**

Have (SOCIAL ANXIETY SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH FUNCTIONING: **How much you been bothered or upset by having** (SOCIAL ANXIETY SXS)**?**

G. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 F74

GO TO ***SPECIFIC PHOBIA*** F.19

IF UNKNOWN: **When did you begin having** (SOCIAL ANXIETY SXS)**?**

Just before you began having (SOCIAL ANXIETY SXS), **were you taking any drugs, caffeine, diet pills, or other medicines?**

(How much coffee, tea, or caffeinated beverages did you drink a day?)

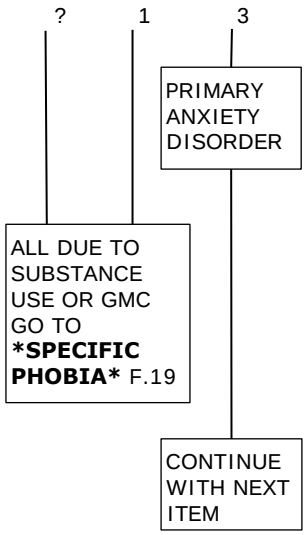
Just before (SOCIAL ANXIETY SXS) **began, were you physically ill?**

IF YES: **What did the doctor say?**

H. [Primary Anxiety Disorder:] The fear, anxiety, or avoidance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition.

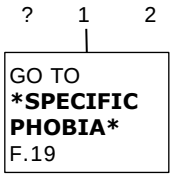
IF THERE IS ANY INDICATION THAT THE ANXIETY MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** F.33, AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to list of etiological medical conditions or substances/medications on page F.4.



IF NECESSARY, RETURN TO THIS ITEM AFTER COMPLETING MODULES FOR OC AND RELATED DISORDERS.

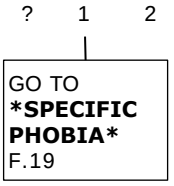
I. The fear, anxiety, or avoidance is not better explained by the symptoms of another mental disorder such as Panic Disorder, Separation Anxiety Disorder, Body Dysmorphic Disorder, or Autism Spectrum Disorder.



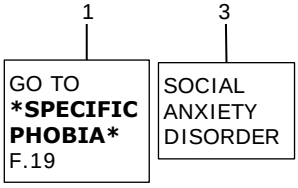
IF A GENERAL MEDICAL CONDITION OR MENTAL DISORDER CHARACTERIZED BY POTENTIALLY EMBARRASSING SYMPTOMS IS PRESENT: **Has your avoidance of** (SOCIAL SITUATIONS) **been related to your** (MEDICAL CONDITION OR MENTAL DISORDER)**?**

IF YES: **How have you dealt with your condition?**

J. If another medical condition (e.g., Parkinson's disease, obesity, disfigurement from burns or injury) [or potentially embarrassing mental disorder] is present, the fear, anxiety, or avoidance is clearly unrelated or is excessive.



SOCIAL ANXIETY DISORDER CRITERIA A, B, C, D, E, F, G, H, I AND J ARE CODED "3."



SOCIAL ANXIETY DISORDER CHRONOLOGY

NOTE: IF LIFETIME ASSESSMENT ALREADY SUGGESTS THE PRESENCE OF SOCIAL ANXIETY DISORDER DURING THE PAST 6 MONTHS, ASK THE FOLLOWING QUESTIONS ONLY IF NEEDED.

A. [During the past 6 months,] marked fear or anxiety about one or more social situations. ? 1 3 F79

→ GO TO ***PAST SOCIAL ANXIETY DISORDER*** F.18

During the past 6 months, since (6 MONTHS AGO), **have you continued to fear or avoid** (SOCIAL SITUATIONS MENTIONED ABOVE)**?**

During the past 6 months, since (6 MONTHS AGO), **have you gone out of your way to avoid** (FEARED SOCIAL SITUATIONS)**?**

IF NO: **During the past 6 months, since** (6 MONTHS AGO), **how hard has it been for you to be in** (FEARED SOCIAL SITUATIONS)**?**

D. [During the past 6 months,] the social situations are avoided or endured with intense fear or anxiety. ? 1 3 F80

→ GO TO ***PAST SOCIAL ANXIETY DISORDER*** F.18

During the past 6 months, what effect have (SOCIAL ANXIETY SXS) **had on your life?**

IF HAVE NOT INTERFERED WITH FUNCTIONING: **During the past 6 months, since** (6 MONTHS AGO), **how much have you been bothered or upset by having** (SOCIAL ANXIETY SXS)**?**

G. [During the past 6 months,] the fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. ? 1 3 F81

→ GO TO ***PAST SOCIAL ANXIETY DISORDER*** F.18

CURRENT SOCIAL ANXIETY DISORDER

CRITERIA A, D, AND G CODED "3" FOR PAST 6 MONTHS 1 3 F82

1 → GO TO ***PAST SOCIAL ANXIETY DISORDER*** F.18

3 → CURRENT SOCIAL ANXIETY DISORDER

IF UNKNOWN: **How old were you when you first started having** (SXS OF SOCIAL ANXIETY DISORDER)**?**

Age at onset of Social Anxiety Disorder (CODE 99 IF UNKNOWN) _____ _____ F83

Specify if:

___ **Performance only:** if the fear is restricted to speaking or performing in public F84

Specify if:

IF UNNOWN: **Have you had any panic attacks in the past month?**

___ **With panic attacks**: if one or more panic attacks in the past month occurring in the context of current Social Anxiety Disorder (see page F.7) and criteria have never been met for Panic Disorder F85

→ GO TO ***SPECIFIC PHOBIA*** F.19

PAST SOCIAL ANXIETY DISORDER

When did you last have (ANY SXS OF SOCIAL ANXIEY DISORDER)**?**	Number of months prior to interview when last had a symptom of Social Anxiety Disorder	____ ____ ____ F86
IF UNKNOWN: **How old were you when you first started having** (SXS OF SOCIAL ANXIETY DISORDER)**?**	Age at onset of Social Anxiety Disorder (CODE 99 IF UNKNOWN)	____ ____ F87

GO TO ***SPECIFIC PHOBIA*** F.19 (NEXT PAGE)

SPECIFIC PHOBIA

SPECIFIC PHOBIA CRITERIA

*IF SCREENING QUESTION #5 ANSWERED "NO," SKIP TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24.*

IF QUESTION #5 ANSWERED "YES":
You've said that there are other things that have made you especially anxious or afraid, like flying, seeing blood, getting a shot, heights, closed places, or certain kinds of animals or insects...

IF SCREENER NOT USED: **Are there any other things that have made you especially anxious or afraid, like flying, seeing blood, getting a shot, heights, closed places, or certain kinds of animals or insects?**

Tell me about that.

F88

SCREEN Q#5
YES | NO

IF NO: GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

A. Marked fear or anxiety about a specific object or situation (e.g., flying, heights, animals, receiving an injection, seeing blood).

F89

? 1 2 3

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

Have you almost always immediately felt frightened or anxious when you were (CONFRONTED WITH PHOBIC STIMULUS)**?**

B. The phobic object or situation almost always provokes immediate fear or anxiety.

F90

? 1 2 3

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

Did you go out of your way to avoid (PHOBIC STIMULUS)**? (Are there things you didn't do because of this fear that you would otherwise have done?)**

IF NO: **How hard was it for you when** (CONFRONTED WITH PHOBIC STIMULUS)**?**

C. The phobic situation(s) is actively avoided, or endured with intense fear or anxiety.

F91

? 1 2 3

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

IF PHOBIC STIMULUS IS POSSIBLY DANGEROUS: **How dangerous would you say it actually is to** (BE EXPOSED TO PHOBIC STIMULUS)**?**

Do you think that you have been more afraid of (PHOBIC STIMULUS) **than you should have been given the actual danger?**

D. The fear or anxiety is out of proportion to the actual danger posed by the specific object or situation and to the sociocultural context.

NOTE: Code "3" if objects or situations do not pose danger or if fear or anxiety is out of proportion to actual danger or sociocultural context.

F92

? 1 2 3

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

IF UNKNOWN: **How long have you had these fears? (For 6 months or more?)**

E. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.

? 1 2 3 F93

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

IF UNKNOWN: **What effect have** (PHOBIC SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION F:

How have (PHOBIC SXS) **affected your relationships with your family, romantic partner or friends?**

How have (PHOBIC SXS) **affected your work/school? (How about your attendance at work or school?)**

How about doing other things that are important to you like religious activities, physical exercise, or hobbies?

IF BLOOD-INJECTION-INJURY TYPE: **Have you avoided going to the dentist or doctor because of** (PHOBIC SXS)**? (How has this affected your health?)**

Have (PHOBIC SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by having** (PHOBIC SXS)**?**

F. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 F94

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

IF NECESSARY, RETURN TO THIS ITEM AFTER COMPLETING MODULES FOR OC AND RELATED DISORDERS AND TRAUMA- AND STRESS-RELATED DISORDERS.

G. The disturbance is not better explained by the symptoms of another mental disorder, including fear, anxiety, and avoidance of situations associated with panic like symptoms or other incapacitating symptoms (as in Agoraphobia), objects or situations related to obsessions (as in Obsessive-Compulsive Disorder) reminders of traumatic events (as in Posttraumatic Stress Disorder), separation from home or attachment figures (as in Separation Anxiety Disorder) or social situations (as in Social Anxiety Disorder).

? 1 3 F95

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

SPECIFIC PHOBIA CRITERIA A, B, C, D, E, F, AND G ARE CODED "3."

1 → GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

3 → SPECIFIC PHOBIA F96

SPECIFIC PHOBIA CHRONOLOGY

NOTE: IF LIFETIME ASSESSMENT ALREADY SUGGESTS THE PRESENCE OF SPECIFIC PHOBIA DURING THE PAST 6 MONTHS, ASK THE FOLLOWING QUESTIONS ONLY IF NEEDED.

During the past 6 months, since (6 MONTHS AGO), **have you continued to fear or avoid** (PHOBIC SITUATIONS MENTIONED ABOVE)**?**

A. [During the past 6 months,] marked fear or anxiety about a specific object or situation. F97

? 1 → GO TO ***PAST SPECIFIC PHOBIA*** F.23

3

In the past 6 months, have you gone out of your way to avoid (PHOBIC STIMULUS)**? (Have there been things you didn't do because of this fear that you would otherwise have done?)**

IF NO: **In the past 6 months, how hard has it been for you when** (CONFRONTED WITH PHOBIC STIMULUS)**?**

C. [During the past 6 months,] the phobic situation(s) is actively avoided, or endured with intense fear or anxiety. F98

? 1 → GO TO ***PAST SPECIFIC PHOBIA*** F.23

3

In the past 6 months, since (6 MONTHS AGO) **what effect have** (PHOBIC SXS) **had on your life?**

IF DOES NOT INTERFERE WITH LIFE: **In the past 6 months, since** (6 MONTHS AGO) **how much have you been bothered or upset by having** (PHOBIC SXS)**?**

F. [During the past 6 months,] the fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. F99

? 1 → GO TO ***PAST SPECIFIC PHOBIA*** F.23

3

CURRENT SPECIFIC PHOBIA

CRITERIA A, C, AND F CODED "3" FOR PAST 6 MONTHS

1 → GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

3 → CURRENT SPECIFIC PHOBIA

F100

IF UNKNOWN: **How old were you when you first started having** (SXS OF SPECIFIC PHOBIA)**?**

Age at onset of Specific Phobia (CODE 99 IF UNKNOWN) ____ ____ F101

Specify if: (Check all that apply)

___ **Animal** (e.g., spiders, insects, dogs) F102

___ **Natural environment** (includes heights, storms, water) F103

___ **Blood-injection-injury** (e.g., needles, invasive medical procedures) F104

___ **Situational** (includes airplanes, elevators, enclosed places) F105

___ **Other type** (e.g., situations that might lead to choking or vomiting)
Specify:_____ F106

F107

*Specify if***:**

If UNKNOWN: **Have you had any panic attacks in the past month?**

___ **With panic attacks**: if one or more panic attacks in the past month occurring in the context of current Specific Phobia (see page F.7) and criteria have never been met for Panic Disorder. F108

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

PAST SPECIFIC PHOBIA

When did you last have (ANY SXS OF SPECIFIC PHOBIA)**?**	Number of months prior to interview when last had a symptom of Specific Phobia	____ ____ ____	F109
IF UNKNOWN: **How old were you when you first started having** (SXS OF SPECIFIC PHOBIA)**?**	Age at onset of Specific Phobia (CODE 99 IF UNKNOWN)	____ ____	F110

GO TO ***CURRENT GENERALIZED ANXIETY DISORDER*** F.24

CURRENT GENERALIZED ANXIETY DISORDER

GENERALIZED ANXIETY DISORDER CRITERIA

*IF SCREENING QUESTION #6 ANSWERED "NO," SKIP TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27*

IF QUESTION #6 ANSWERED "YES": **You've said that over the last several months you've been feeling anxious and worried for a lot of the time. (Tell me about that.)**

IF SCREENER NOT USED: **Over the last several months, have you been feeling anxious and worried for a lot of the time? (Tell me about that.)**

SCREEN Q#6 **YES** | | **NO** F111

GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27

What kinds of things have you worried about? (What about your job, your health, your family members, your finances, or other smaller things like being late for appointments?) How much did you worry about (EVENTS OR ACTIVITIES)**? What else have you worried about?**

Have you worried about (EVENTS OR ACTIVITIES) **even when there was no reason? (Have you worried more than most people would in your circumstances? Has anyone else thought you worried too much? Have you worried more than you should have given your actual circumstances?)**

During the last 6 months, since (6 MONTHS AGO)**, would you say that you have been worrying more days than not?**

A. Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance).

? 1 2 3 F112

GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27

When you're worrying this way, have you found that it's hard to stop yourself or to think about anything else?

B. The person finds it difficult to control the worry.

? 1 2 3 F113

GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27

Now I am going to ask you some questions about symptoms that often go along with being nervous or worried.

Thinking about those periods since (6 MONTHS AGO) **when you have been feeling nervous, anxious, or worried...**

C. The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms present for more days than not for the past 6 months):

...have you often felt physically restless, like you couldn't sit still?

...have you often felt keyed up or on edge?

1. Restlessness or feeling keyed up or on edge.

? 1 2 3 F114

...have you often tired easily?

2. Being easily fatigued.

? 1 2 3 F115

?=Inadequate information 1=Absent or false 2=Subthreshold 3=Threshold or true

...have you often had trouble concentrating or has your mind often gone blank?	3. Difficulty concentrating or mind going blank.	? 1 2 3	F116
...have you often been irritable?	4. Irritability.	? 1 2 3	F117
...have your muscles often been tense?	5. Muscle tension.	? 1 2 3	F118
...have you often had trouble falling or staying asleep? How about often feeling tired when you woke up because you didn't get a good night's sleep?	6. Sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep).	? 1 2 3	F119
IF UNCLEAR: **Did at least some of these symptoms like** (SXS CODED "3") **happen for more days than not over the past 6 months?**	AT LEAST THREE "C" SXS ARE CODED "3" AND AT LEAST SOME OCCURRED MORE DAYS THAN NOT FOR PAST 6 MONTHS	? 1 2 3 GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27	F120
IF UNKNOWN: **What effect have** (GAD SXS) **had on your life?** *ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION D:* **How have** (GAD SXS) **affected your relationships or your interactions with other people? (Have** [GAD SXS] **caused you any problems in your relationships with your family, romantic partner or friends?)** **How have** (GAD SXS) **affected your work/schoolwork? (How about your attendance at work or school? Have** [GAD SXS] **made it more difficult to do your work/schoolwork? How have** [GAD SXS] **affected the quality of your work/schoolwork?)** **How have** (GAD SXS) **affected your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Have you avoided doing anything because you felt like you weren't up to it?** **Has your anxiety or worry affected any other important part of your life?** *IF HAS NOT INTERFERED WITH LIFE:* **How much have you been bothered or upset by having** (GAD SXS)**?**	D. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.	? 1 2 3 GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27	F121

IF UNKNOWN: **When did** (GAD SXS) **begin?**

Just before you began having (GAD SXS), **were you taking any drugs, caffeine, diet pills, or other medicines?**

(How much coffee, tea, or caffeinated soda do you drink a day?)

Just before (GAD SXS) **began, were you physically ill?**

IF YES: **What did the doctor say?**

E. [Primary Anxiety Disorder:] The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or to another medical condition. F122

IF THERE IS ANY INDICATION THAT THE ANXIETY MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE/MEDICATION), GO TO ***GMC/SUBSTANCE*** F.33 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to list of etiological medical conditions and substances/medications on page F.4.

? 1 3

? or 1 → ALL DUE TO GMC OR SUBSTANCE/MEDICATION USE. GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27

3 → PRIMARY ANXIETY DISORDER → CONTINUE WITH NEXT ITEM

IF NECESSARY, RETURN TO THIS ITEM AFTER COMPLETING MODULE FOR OC AND RELATED DISORDERS, EATING DISORDERS, AND SOMATIC SYMPTOM DISORDERS.

F. The disturbance is not better explained by another mental disorder (e.g., anxiety or worry about having a panic attacks in Panic Disorder, negative evaluation in Social Anxiety Disorder, contamination or other obsessions in Obsessive Compulsive Disorder, separation from attachment figures in Separation Anxiety Disorder, gaining weight in Anorexia Nervosa, physical complaints in Somatic Symptom disorder, perceived appearance flaws in Body Dysmorphic Disorder or having a serious illness in Illness Anxiety Disorder, or the content of delusional beliefs in Schizophrenia or Delusional Disorder). F123

? 1 3

? or 3 → GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27

GENERALIZED ANXIETY CRITERIA A, B, C, D, E, AND F ARE CODED "3." F124

1 → GO TO ***PAST GENERALIZED ANXIETY DISORDER*** F.27

3 → CURRENT GENERALIZED ANXIETY DISORDER

AGE AT ONSET

IF UNKNOWN: **How old were you when you first started having** (GAD SXS)**?**

Age at onset of Generalized Anxiety Disorder (CODE 99 IF UNKNOWN) ____ ____ F125

Specify if:

IF UNKNOWN: **Have you had any panic attacks in the past month?**

___ **With panic attacks:** if one or more panic attacks in the past month occurring in the context of current Generalized Anxiety Disorder (see page F.7) and criteria have never been met for Panic Disorder F126

GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 ***OR*** ***SEPARATION ANXIETY DISORDER*** Opt-F.1

PAST GENERALIZED ANXIETY DISORDER

GENERALIZED ANXIETY DISORDER CRITERIA

IF SCREENING QUESTION #7 ANSWERED "NO," SKIP TO ****OTHER SPECIFIED ANXIETY DISORDER**** *F.31 OR* ****SEPARATION ANXIETY DISORDER**** *Opt-F.1*

SCREEN Q#7 **YES** | | **NO** F127

GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 *OR* ***SEPARATION ANXIETY DISORDER*** Opt-F.1

IF QUESTION #7 ANSWERED "YES": **You've said that you have had a time lasting at least several months in which you were feeling anxious and worried for a lot of the time? (Tell me about that.)**

IF SCREENER NOT USED: **Have you ever had a time lasting at least several months in which you were feeling anxious and worried for a lot of the time? (Tell me about that time.)**

What kinds of things did you worry about? (What about your job, your health, your family members, your finances, or other smaller things like being late for appointments?) How much did you worry about (EVENTS OR ACTIVITIES)**? What else did you worry about?**

Did you worry about (EVENTS OR ACTIVITIES) **even when there was no reason? (Did you worry more than most people would in your circumstances? Did anyone else think you worried too much? Did you worry more than you should have given your actual circumstances?)**

When was that? How long did it last? (At least 6 months?) During that time, were you worrying more days than not?

A. Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance).

? 1 2 3 F128

GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 *OR* ***SEPARATION ANXIETY DISORDER*** Opt-F.1

When you were worrying, did you find that it was hard to stop yourself?

B. The person finds it difficult to control the worry.

? 1 2 3 F129

GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 *OR* ***SEPARATION ANXIETY DISORDER*** Opt-F.1

Now I am going to ask you some questions about symptoms that often go along with being nervous or worried.

Thinking about those times during (6-MONTH PERIOD OF ANXIETY AND WORRY NOTED ABOVE) **when you were feeling nervous, anxious, or worried...**

C. The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms present for more days than not for the past 6 months):

...did you often feel physically restless, like you can't sit still? **...did you often feel keyed up or on edge?**	1. Restlessness or feeling keyed up or on edge.	?	1	2	3	F130
...did you often tire easily?	2. Being easily fatigued.	?	1	2	3	F131
...did you often have trouble concentrating or did your mind often go blank?	3. Difficulty concentrating or mind going blank.	?	1	2	3	F132
...were you often irritable?	4. Irritability.	?	1	2	3	F133
...were your muscles often tense?	5. Muscle tension.	?	1	2	3	F134
...did you often have trouble falling or staying asleep? How about often feeling tired when you woke up because you didn't get a good night's sleep?	6. Sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep).	?	1	2	3	F135
IF UNCLEAR: **Did at least some of these symptoms like** (SXS CODED "3") **happen for more days than not over the** (6 MONTH PERIOD OF ANXIETY AND WORRY)**?**	AT LEAST THREE "C" SXS ARE CODED "3."	?	1	2	3	F136

GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 *OR* ***SEPARATION ANXIETY DISORDER*** Opt-F.1

IF UNKNOWN: **What effect did** (GAD SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION D:

How did (GAD SXS) **affect your relationships or your interactions with other people? (Did** [GAD SXS] **cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (GAD SXS) **affect your school/ work? (How about your attendance at work or school? Did** [GAD SXS] **make it more difficult to do your work/ schoolwork)? How did** [GAD SXS] **affect the quality of your work/schoolwork?)**

How did (GAD SXS) **affect your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Did your anxiety or worry affect any other important part of your life?

IF HAS NOT INTERFERED WITH LIFE: **How much were you bothered or upset by having** (GAD SXS)**?**

D. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 F137

GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31
OR
SEPARATION ANXIETY DISORDER
Opt-F.1

IF UNKNOWN: **When did** (GAD SXS) **begin?**

Just before you began having (GAD SXS)**, were you taking any drugs, caffeine, diet pills, or other medicines?**

(How much coffee, tea, or caffeinated soda did you drink a day?)

Just before (GAD SXS) **began, were you physically ill?**

IF YES: **What did the doctor say?**

E. [Primary Anxiety Disorder:] The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or to another medical condition.

IF THERE IS ANY INDICATION THAT THE ANXIETY MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE/MEDICATION), GO TO ***GMC/SUBSTANCE*** F.33 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to list of etiological medical conditions and substances/medications on page F.4.

? 1 3 F138

? or 1 → ALL DUE TO GMC OR SUBSTANCE/ MEDICATION USE. GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 *OR* ***SEPARATION ANXIETY DISORDER*** Opt-F.1

3 → PRIMARY ANXIETY DISORDER → CONTINUE WITH NEXT ITEM

IF NECESSARY, RETURN TO THIS ITEM AFTER COMPLETING MODULE FOR OC AND RELATED DISORDERS, EATING DISORDERS, AND SOMATIC SYMPTOM DISORDERS.

F. The disturbance is not better explained by another mental disorder (e.g., anxiety or worry about having a panic attacks in Panic Disorder, negative evaluation in Social Anxiety Disorder, contamination or other obsessions in Obsessive Compulsive Disorder, separation from attachment figures in Separation Anxiety Disorder, gaining weight in Anorexia Nervosa, physical complaints in Somatic Symptom Disorder, perceived appearance flaws in Body Dysmorphic Disorder or having a serious illness in Illness Anxiety Disorder, or the content of delusional beliefs in Schizophrenia or Delusional Disorder).

? 1 3 F139

? or 1 → GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 *OR* **SEPARATION ANXIETY DISORDER*** Opt-F.1

GENERALIZED ANXIETY CRITERIA A, B, C, D, E, AND F ARE CODED "3."

1 3 F140

1 → GO TO ***OTHER SPECIFIED ANXIETY DISORDER*** F.31 *OR* ***SEPARATION ANXIETY DISORDER*** Opt-F.1

3 → PAST GENERALIZED ANXIETY DISORDER

AGE AT ONSET

IF UNKNOWN: **How old were you when you first started having** (GAD SXS)**?**

Age at onset of Generalized Anxiety Disorder (CODE 99 IF UNKNOWN) ____ ____ F141

OTHER SPECIFIED ANXIETY DISORDER

NOTE: IF ANXIETY SYMPTOMS ARE CURRENT AND ARE TEMPORALLY ASSOCIATED WITH A PSYCHOSOCIAL STRESSOR, CONSIDER ADJUaSTMENT DISORDER, PAGE L.20

IF UNKNOWN: **What effect did** (ANXIETY SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION:

How have (ANXIETY SXS) **affected your relationships or your interactions with other people? (Have** [ANXIETY SXS] **caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (ANXIETY SXS) **affected your school/work? (How about your attendance at work or school? Have** [ANXIETY SXS] **made it more difficult to do your work/ schoolwork? How have** [ANXIETY SXS] **affected the quality of your work/schoolwork?)**

How have (ANXIETY SXS) **affected your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Have you avoided doing anything because you felt like you weren't up to it?**

Have your anxiety or worry affected any other important part of your life?

IF HAS NOT INTERFERED WITH LIFE: **How much were you bothered or upset by having** (ANXIETY SXS)**?**

OTHER SPECIFIED ANXIETY DISORDER CRITERIA

Symptoms characteristic of an anxiety disorder…predominate…but do not meet full criteria for any of the disorders in the Anxiety Disorders diagnostic class [or for Adjustment Disorder with Anxiety or Adjustment Disorder with Mixed Anxiety and Depression].

1 3 F142

GO TO NEXT MODULE

[Symptoms] cause clinically significant distress or impairment in social, occupational, or other important areas of functioning

? 1 2 3 F143

GO TO NEXT MODULE

Just before you began having (ANXIETY SXS) **were you taking any drugs, stimulants or medicines?**

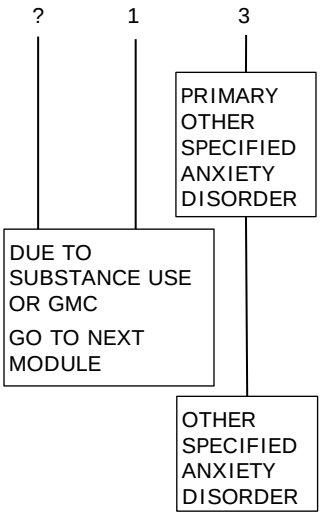
(How much coffee, tea, or caffeinated beverages do you drink a day?)

Just before (ANXIETY SXS) **began, were you physically ill? (What did the doctor say?)**

[Primary Other Specified Anxiety Disorder:] Not due to the direct physiological effects of a substance (e.g., a drug of abuse), medication or to another medical condition.

IF THERE IS ANY INDICATION THAT THE ANXIETY MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE/MEDICATION), GO TO ***GMC/SUBSTANCE*** F.33 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to list of etiological medical conditions and substances/medications on page F.4.



F144

IF UNCLEAR: **During the past month, have you had** (ANXIETY SXS)**?**

Check here____ if current in the past month.

F145

*Indicate **type** of Other Specified Anxiety Disorder:* (circle the appropriate number)

F146

1 – **Limited-symptom panic attacks**

2 – **Generalized anxiety not occurring more days than not**

3 – Situations in which the clinician has concluded that an Anxiety Disorder is present but is **unable to determine whether it is primary or secondary** (i.e., due to another medical condition or is substance/medication-induced).

4 – **Other**: _____

5 – **Unspecified**: There is insufficient information to make a more specific diagnosis.

GO TO

GO TO NEXT MODULE

GMC/SUBSTANCE AS ETIOLOGY FOR ANXIETY SYMPTOMS

ANXIETY DISORDER DUE TO ANOTHER MEDICAL CONDITION

ANXIETY DISORDER DUE TO ANOTHER MEDICAL CONDITION CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH A GENERAL CONDITION CHECK HERE ___ AND GO TO ***SUBSTANCE/MEDICATION-INDUCED ANXIETY DISORDER*** F.35 F147

CODE BASED ON INFORMATION ALREADY OBTAINED

A. Panic attacks or anxiety is predominant in the clinical picture. ? 1 3 F148

B/C. There is evidence from this history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of another medical condition AND the disturbance is not better accounted for by another mental disorder. ? 1 2 3 F149

GO TO ***SUBSTANCE INDUCED*** F.35

Did the (ANXIETY SXS) **start or get much worse only after** (GMC) **began? How long after** (GMC) **began did** (ANXIETY SXS) **start or get much worse?**

NOTE: The following factors should be considered and, if present, support the conclusion that a general medical condition is etiologic to the anxiety symptoms.

IF GMC HAS RESOLVED: **Did the** (ANXIETY SXS) **get better once the** (GMC) **got better?**

1) There is evidence from the literature of a well-established association between the general medical condition and the anxiety symptoms. (Refer to list of etiological general medical conditions on page F.4.)

2) There is a close temporal relationship between the course of the anxiety symptoms and the course of the general medical condition.

3) The anxiety symptoms are characterized by unusual presenting features (e.g., late age-at-onset).

4) The absence of alternative explanations (e.g., anxiety symptoms as a psychological reaction to the stress of being diagnosed with a general medical condition).

IF UNKNOWN: **What effect did** (ANXIETY SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How did (ANXIETY SXS) **affect your relationships or your interactions with other people? (Did** [ANXIETY SXS] **cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (ANXIETY SXS) **affect your school/work? (How about your attendance at work or school? Did** [ANXIETY SXS] **make it more difficult to do your work/schoolwork? How did** [ANXIETY SXS] **affect the quality of your work/schoolwork?)**

How did (ANXIETY SXS) **affect your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Did your anxiety or worry affect any other important part of your life?

IF HAS NOT INTERFERED WITH LIFE: **How much were you bothered or upset by having** (ANXIETY SXS)**?**

E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

NOTE: The D criterion (delirium rule-out) has been omitted.

? 1 2 3 F150

GO TO ***SUBSTANCE INDUCED*** F.35

ANXIETY DISORDER DUE TO AMC CRITERIA A, B/C, AND E CODED "3."

1 3 F151

ANXIETY DISORDER DUE TO AMC

F152

Check here____ if current in the past month.

F153

Specify if:

___ **With panic attacks** (Refer to page F.7)

CONTINUE ON NEXT PAGE

SUBSTANCE/MEDICATION-INDUCED ANXIETY DISORDER

SUBSTANCE/MEDICATION-INDUCED ANXIETY DISORDER CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH SUBSTANCE/MEDICATION USE, CHECK HERE ___ AND RETURN TO DISORDER BEING EVALUATED, CONTINUING WITH THE ITEM FOLLOWING "SYMPTOMS ARE NOT ATTRIBUTABLE TO THE PHYSIOLOGICAL EFFECTS OF A SUBSTANCE OR ANOTHER MEDICAL CONDITION" (SEE PAGE NUMBERS IN BOX TO THE RIGHT).

F154

EPISODE BEING EVALUATED:	
Panic	F.4
Social Anxiety Disorder	F.16
Current GAD	F.26
Past GAD	F.30
Other Specified Anxiety	F.32

CODE BASED ON INFORMATION ALREADY OBTAINED

A. Panic attacks or anxiety is predominant in the clinical picture. ? 1 2 3 F155

IF NOT KNOWN: **When did the** (ANXIETY SXS) **begin? Were you already using** (SUBSTANCE/MEDICATION) **or had you just stopped or cut down your use?**

IF UNKNOWN: **How much** (SUBSTANCE/MEDICATION) **were you using when you began to have** (ANXIETY SXS)**?**

B. There is evidence from the history, physical examination, or laboratory findings of both (1) and (2): ? 1 2 3 F156

1. The symptoms in criterion A developed during or soon after substance intoxication or withdrawal or exposure to a medication.

2. The involved substance/ medication is capable of producing the symptoms in Criterion A.

NOT SUBSTANCE INDUCED
RETURN TO DISORDER BEING EVALUATED

NOTE: Refer to list of substances/medications on page F.4.

ASK ANY OF THE FOLLOWING QUESTIONS AS NEEDED TO RULE OUT A NON-SUBSTANCE-INDUCED ETIOLOGY:

C. The disturbance is NOT better accounted for by an anxiety disorder that is not substance-induced. Such evidence of an independent anxiety disorder could include the following: ? 1 3 F157

IF UNKNOWN: **Which came first, the** (SUBSTANCE/MEDICATION USE) **or the** (ANXIETY SXS)**?**

IF UNKNOWN: **Have you had a period of time when you stopped using** (SUBSTANCE/MEDICATION)?

IF YES: **After you stopped using** (SUBSTANCE/MEDICATION) **did the** (ANXIETY SXS) **go away or get better?**

IF YES: **How long did it take for them to get better? Did they go away within a month of stopping?**

NOT SUBSTANCE INDUCED
RETURN TO DISORDER BEING EVALUATED

NOTE: The following three statements constitute evidence that the anxiety symptoms are not substance-induced. Code "1" if any are true. Code "3" only if none are true.

1) The symptoms precede the onset of the substance/medication use;

2) The symptoms persist for a substantial period of time (e.g., about 1 month) after the cessation of acute withdrawal or severe intoxication; or

IF UNKNOWN: **Have you had any other episodes of** (ANXIETY SXS)**?**

IF YES: **How many? Were you using** (SUBSTANCE/MEDICATION) **at those times?**

3) There is other evidence suggesting the existence of an independent non-substance/ medication-induced anxiety disorder (e.g., a history of recurrent non-substance/ medication-related episodes).

IF UNKNOWN: **What effect did** (ANXIETY SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How did (ANXIETY SXS) **affect your relationships or your interactions with other people? (Did** [ANXIETY SXS] **cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (ANXIETY SXS) **affect your work/schoolwork? (How about your attendance at work or school? Did** [ANXIETY SXS] **make it more difficult to do your work/schoolwork? How did** [ANXIETY SXS] **affect the quality of your work/schoolwork?)**

How did (ANXIETY SXS) **affect your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Did your anxiety or worry affect any other important part of your life?

IF HAS NOT INTERFERED WITH LIFE: **How much were you bothered or upset by having** (ANXIETY SXS)**?**

E. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 F158

→ RETURN TO DISORDER BEING EVALUATED

NOTE: The D criterion (delirium rule-out) has been omitted.

SUBSTANCE-INDUCED ANXIETY DISORDER CRITERIA A, B, C, AND E ARE CODED "3."

1 3 F159

→ SUBSTANCE-INDUCED ANXIETY DISORDER

Check here____ if current in the past month. F160

*Indicate **context of development** of anxiety symptoms*: F161

1 – **With onset during intoxicati**on

2 – **With onset during withdrawal**

3 – **With onset after medication use**

Specify if: F162

___ **With panic attacks** (Refer to page F.7)

→ RETURN TO EPISODE BEING EVALUATED

0G. OBSESSIVE-COMPULSIVE AND RELATED DISORDERS

OBSESSIVE-COMPULSIVE DISORDER

*IF SCREENING QUESTIONS #8, #9, AND #10 ARE ALL ANSWERED "NO" SKIP TO ***COMPULSIONS*** G.2, (NOTE: BECAUSE SOME SUBJECTS WITH OCD MAY BE RELUCTANT TO CONFIDE THEIR OBSESSIONS DURING THE SCREENING, CONSIDER RE-ASKING SCREENING QUESTIONS BELOW AT THIS POINT IN THE SCID.)*

IF QUESTION #8 ANSWERED "YES": **You've said that you've been bothered by thoughts that kept coming back to you even when you didn't want them to, like being exposed to germs or dirt or needing everything to be lined up in a certain way. What were they?**

IF QUESTION #9 ANSWERED "YES": **You've [also] said that you've had images pop into your head that you didn't want like violent or horrible scenes or something of a sexual nature. What were they?**

IF QUESTION #10 ANSWERED "YES": **You've [also] said that you've had urges to do something that kept coming back to you even though you didn't want them to, like an urge to harm a loved one. What were they?**

IF SCREENER NOT USED: **Have you ever been bothered by thoughts that kept coming back to you even when you didn't want them to, like being exposed to germs or dirt or needing everything to be lined up in a certain way? (What were they?)**

How about having images pop into your head that you didn't want like violent or horrible scenes or something of a sexual nature? (What were they?)

How about having urges to do something that kept coming back to you even though you didn't want them to, like an urge to harm a loved one? (What were they?)

IF YES TO ANY OF ABOVE: **Have these** (THOUGHTS/IMAGES/URGES) **made you very anxious or upset?**

When you had these (THOUGHTS/IMAGES/URGES) **did you try hard to get them out of your head? (What would you try to do?)**

OBSESSIVE-COMPULSIVE DISORDER CRITERIA

SCREEN Q#8 YES | | NO — G1

SCREEN Q#9 YES | | NO — G2

SCREEN Q#10 YES | | NO — G3

IF ALL ARE ANSWERED "NO" SKIP TO ***COMPULSIONS*** G.2

A. Presence of obsessions, compulsions, or both:

Obsessions are defined by (1) and (2):

1. Recurrent and persistent thoughts, urges, or images that are experienced, at some time during the disturbance, as intrusive and unwanted, and that in most individuals cause marked anxiety or distress.

? 1 2 3 — G4

NO OBSESSIONS GO TO ***COMPULSIONS*** G.2

2. The individual attempts to ignore or suppress such thoughts, urges, or images, or to neutralize them with some other thought or action (i.e., by performing a compulsion).

? 1 2 3 — G5

NO OBSESSIONS CONTINUE ON NEXT PAGE

OBSESSIONS

DESCRIBE CONTENT OF OBSESSION(S):

COMPULSIONS

*IF SCREENING QUESTION #11 ANSWERED "NO," GO TO ***SKIP OUT IF NEITHER OBSESSIONS NOR COMPULSIONS*** G.3 (NOTE: BECAUSE SOME SUBJECTS WITH OCD MAY BE RELUCTANT TO CONFIDE THEIR COMPULSIONS DURING THE SCREENING, CONSIDER RE-ASKING SCREENING QUESTION BELOW AT THIS POINT IN THE SCID.)*

SCREEN Q#11 G6
YES | | NO

IF NO: GO TO ***SKIP OUT IF NEITHER OBSESSIONS NOR COMPULSIONS*** G.3

IF QUESTION #11 ANSWERED "YES": **You've said that there were things you had to do over and over again and were hard to resist doing, like washing your hands again and again, repeating something over and over again until it "felt right," counting up to a certain number, or checking something many times to make sure that you'd done it right. Tell me about that.**

IF SCREENER NOT USED: **Was there ever anything that you had to do over and over again and was hard to resist doing, like washing your hands again and again, repeating something over and over again until it "felt right," counting up to a certain number, or checking something many times to make sure that you'd done it right?**

Tell me about that. (What did you have to do?)

IF UNCLEAR: **Why did you have to do** (COMPULSIVE ACT)**? What would happen if you didn't do it?**

IF UNCLEAR: **How many times would you do** (COMPULSIVE ACT)**? Have you been doing** (COMPULSIVE ACT) **more than really made sense?**

Compulsions are defined by (1) and (2):

1. Repetitive behaviors (e. g., hand washing, ordering, checking) or mental acts (e.g., praying, counting, repeating words silently) that the individual feels driven to perform in response to an obsession, or according to rules that must be applied rigidly.

? 1 2 3 G7

2. The behaviors or mental acts are aimed at preventing or reducing anxiety or distress, or preventing some dreaded event or situation; however these behaviors or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent, or are clearly excessive.

? 1 2 3 G8

COMPULSIONS

*GO TO ***SKIP OUT IF NEITHER OBSESSIONS NOR COMPULSIONS*** G.3 (TOP OF NEXT PAGE)*

DESCRIBE CONTENT OF COMPULSION(S):

SKIP OUT IF NEITHER OBSESSIONS NOR COMPULSIONS

→ *IF EITHER OBSESSIONS OR COMPULSIONS, OR BOTH, CONTINUE BELOW.*

→ *IF NEITHER OBSESSIONS NOR COMPULSIONS, CHECK HERE ___ AND GO TO* ****OTHER SPECIFIED OC AND RELATED DISORDER**** *G.8 OR* ****HOARDING DISORDER (OPTIONAL)**** *Opt-G.1.* G9

IF UNKNOWN: **How much time do you spend on** (OBSESSION OR COMPULSION)**?**

IF UNKNOWN: **What effect did these** (OBSESSIONS OR COMPULSIONS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION B:

How have (OBSESSIONS OR COMPULSIONS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner, roommates or friends?)**

How have (OBSESSIONS OR COMPULSIONS) **affected your work/school? (How about your attendance at work or school? Have** [OBSESSIONS OR COMPULSIONS] **made it more difficult to do your work/ schoolwork)? How have** (OBSESSIONS OR COMPULSIONS) **affected the quality of your work/schoolwork?)**

How have (OBSESSIONS OR COMPUSIONS) **affected your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies?**

Have (OBSESSIONS OR COMPULSIONS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered by having** (OBSESSIONS OR COMPULSIONS)?

B. The obsessions or compulsions are time consuming (e.g., take more than 1 hour per day) or cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 G10

GO TO ***OTHER SPECIFIED OC AND RELATED DISORDER*** G.8, ***OR*** GO TO ***HOARDING DISORDER (OPTIONAL)*** Opt-G.1

IF UNKNOWN: **When did** (OBSESSIONS OR COMPULSIONS) **begin?**

Just before this began, were you physically ill?

IF YES: **What did the doctor say?**

Just before this began, were you using any medications?

IF YES: **Any change in the amount you were using?**

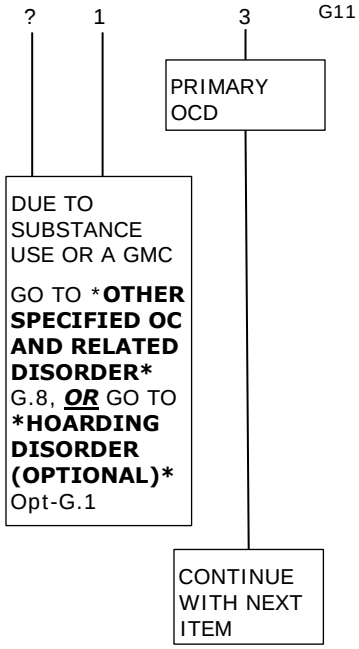
Just before this began, were you drinking or using any drugs?

C. [Primary Obsessive-Compulsive Disorder.] The obsessive-compulsive symptoms are not attributable to the physiological effects of a substance/medication or to another medical condition.

IF THERE IS ANY INDICATION THAT THE OBSESSIONS OR COMPULSIONS MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/SUBSTANCE*** G.11 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

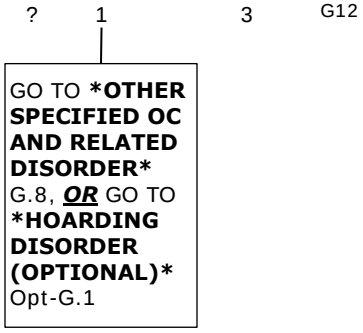
Etiological medical conditions include: Sydenham's chorea, medical conditions leading to striatal damage, such as cerebral infarction.

Etiological substances/medications include: intoxication with cocaine, amphetamines or other stimulants and exposure to heavy metals.



IF NECESSARY, RETURN TO THIS ITEM AFTER COMPLETING MODULES FOR OPTIONAL OC AND RELATED DISORDERS, SOMATIC SYMPTOM DISORDERS, AND TRAUMA- AND STRESS-RELATED DISORDERS.

D. The disturbance is not better explained by the symptoms of another mental disorder (e.g., excessive worries, as in Generalized Anxiety Disorder; preoccupation with appearance, as in Body Dysmorphic Disorder; difficulty discarding or parting with possessions, as in Hoarding Disorder; hair pulling, as in Trichotillomania; skin picking, as in Excoriation Disorder; stereotypies, as in Stereotypic Movement Disorder; ritualized eating behavior, as in Eating Disorders; preoccupation with substances or gambling, as in Substance-Related and Addictive Disorders; preoccupation with having an illness, as in Illness Anxiety Disorder; sexual urges or fantasies, as in Paraphilic Disorders; impulses, as in Disruptive, Impulse-Control, and Conduct Disorders; guilty ruminations, as in Major Depressive Disorder; thought insertion or delusional preoccupations, as in Schizophrenia Spectrum and Other Psychotic Disorders; or repetitive patterns of behavior, as in Autism Spectrum Disorder).



OBSESSIVE COMPULSIVE DISORDER
CRITERIA A, B, C, D, AND E ARE CODED "3."

1 → GO TO ***OTHER SPECIFIED OC AND RELATED DISORDER*** G.8, ***OR*** GO TO ***HOARDING DISORDER (OPTIONAL)*** Opt-G.1

3 → OBSESSIVE-COMPULSIVE DISORDER; CONTINUE BELOW. G13

OCD CHRONOLOGY

NOTE: IF LIFETIME ASSESSMENT HAS ALREADY DETERMINED THE PRESENCE OF OBSESSIONS AND/OR COMPULSIONS DURING THE PAST MONTH, ASK THE FOLLOWING QUESTIONS ONLY IF NEEDED.

Since (1 MONTH AGO), **have you had any** (OBSESSIONS OR COMPULSIONS MENTIONED ABOVE)**?**

A. [During the past month,] presence of obsessions, compulsions, or both.

? 1 → GO TO ***PAST OCD*** G.7

3 G14

Since (1 MONTH AGO), **how much time have you spent on** (OBSESSIONS OR COMPULSIONS)**?**

IF UNKNOWN: **During the past month, since** (1 MONTH AGO), **what effect have** (OBSESSIONS OR COMPULSIONS) **had on your life?**

IF DID NOT INTERFERE WITH LIFE: **During the past month, since** (1 MONTH AGO), **how much have you been bothered by having** (OBSESSIONS OR COMPULSIONS)**?**

B. [During the past month,] the obsession or compulsions are time consuming (e.g. take more than 1 hour per day) or cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 → GO TO ***PAST OCD*** G.7

3 G15

CURRENT OCD

CRITERIA A AND B CODED "3" FOR PAST MONTH

? 1 3 G16

GO TO ***PAST OCD*** G.7

CURRENT OCD

IF UNKNOWN: **How old were you when you first started having** (OCD SXS)**?**

Age at onset of Obsessive Compulsive Disorder (CODE 99 IF UNKNOWN)

_____ _____ G17

IF MORE THAN ONE OCD BELIEF INVOLVING A FEARED CONSEQUENCE: **Which belief about something terrible that could happen to you or someone else is the most upsetting to you? (Like if you don't check the stove over and over the house will burn down, or if you touch an ashtray you'll get cancer, or if you felt a bump in the road while you were driving you believed you really did run over someone.)**

On average, over the past week, how strongly did you believe this terrible thing was going to happen? (Were you completely convinced?)

Specify current ***level of insight*** (i.e., during the past week): (circle the appropriate number) G18

1 - **With good or fair insight**: The individual recognizes that Obsessive-Compulsive Disorder beliefs are definitely or probably not true or that they may or may not be true.

2 - **With poor insight**: The individual thinks Obsessive-Compulsive Disorder beliefs are probably true.

3 - **With absent insight/delusional beliefs**: The individual is completely convinced that Obsessive-Compulsive Disorder beliefs are true.

4 - **Not applicable**. OCD symptoms are not associated with a feared consequence that involves a belief.

Specify if:

IF UNKNOWN: **Has there ever been a time when you had tics, where you were repeatedly making sounds or movements that were difficult to control?**

___ **Tic-related**: The individual has a current or past history of a Tic Disorder (i.e., a disturbance characterized by sudden, rapid, recurrent, nonrhythmic motor movements or vocalizations) [typically based on clinician judgment of a current or past diagnosis of Tic Disorder] G19

Specify if:

IF UNKNOWN: **Have you had any panic attacks in the past month?**

___ **With panic attacks:** If one or more panic attacks in the past month occurring in the context of current Obsessive Compulsive Disorder (see page F.7) and criteria have never been met for Panic Disorder. G20

GO TO ***OTHER SPECIFIED OC AND RELATED DISORDER*** G.8, ***OR*** GO TO ***HOARDING DISORDER (OPTIONAL)*** Opt-G.1

PAST OCD

When did you last have (ANY OCD SXS)**?**	Number of months prior to interview when last had a symptom of Obsessive Compulsive Disorder	____ ____ ____	G21
IF UNKNOWN: **How old were you when you first started having** (OCD SXS)**?**	Age at onset of Obsessive Compulsive Disorder (CODE 99 IF UNKNOWN)	____ ____	G22

GO TO ***OTHER SPECIFIED OC AND RELATED DISORDER*** G.8, ***OR*** GO TO ***HOARDING DISORDER (OPTIONAL)*** Opt-G.1

OTHER SPECIFIED OBSESSIVE-COMPULSIVE AND RELATED DISORDER

IF UNKNOWN: **What effect did have** (OC-RELATED SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION:

How have (OC-RELATED SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (OC-RELATED SXS) **affected your work/school? (How about your attendance at work or school? Have** [OC-RELATED SXS] **made it more difficult to do your work/schoolwork? How did** [OC-RELATED SXS] **affect the quality of your work/schoolwork?)**

How have (OC-RELATED SXS) **affected your ability to take care of things at home? What about being involved in things that are important to you, like religious activities, physical exercise, or hobbies? Have you avoided situations or people because you didn't want other people to see you doing** (OC-RELATED BEHAVIORS)**?**

Have (OC-RELATED SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much has your** (OC-RELATED SXS) **bothered or upset you?**

OTHER SPECIFIED OBSESSIVE-COMPULSIVE AND RELATED DISORDER CRITERIA

A presentation in which symptoms characteristic of an Obsessive-Compulsive and Related Disorder predominate but do not meet the full criteria for any of the disorders in the obsessive-compulsive and related disorders diagnostic class.

1 3 G23

GO TO NEXT MODULE

[Symptoms] cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate.

? 1 2 3 G24

GO TO NEXT MODULE

IF UNKNOWN: **When did** (OC-RELATED SXS) **begin?**

Just before (OC-RELATED SXS) **began, were you physically ill?**

IF YES: **What did the doctor say?**

Just before (OC-RELATED SXS) **began, were you using any medications?**

IF YES: **Any change in the amount you were using?**

Just before (OC-RELATED SXS) **began, were you drinking or using any drugs?**

[Primary Other OC and Related Disorder: Not due to the direct physiological effects of a substance/medication or to another medical condition.]

IF THERE IS ANY INDICATION THAT THE OC-RELATED SYMPTOMS MAY BE SECONDARY (I.E., A DIRECT PHYSIOLOGICAL CONSEQUENCE OF GMC OR SUBSTANCE), GO TO ***GMC/ SUBSTANCE*** G.11 AND RETURN HERE TO MAKE A RATING OF "1" OR "3."

NOTE: Refer to list of etiological medical conditions and substances/medications on page G.4.

? 1 3 G25

PRIMARY OTHER OC AND RELATED DISORDER

DUE TO SUB-STANCE USE OR GMC

GO TO NEXT MODULE

OTHER SPECIFIED OC AND RELATED DISORDER

IF UNCLEAR: **During the past month, since** (1 MONTH AGO), **have you had** (OC-RELATED SXS)**?**

Check here ___ if present in past month. G26

CONTINUE WITH TYPE ON NEXT PAGE

*Indicate **type** of other specified OC and Related Disorder*: (circle the appropriate number)

G27

1 - **Body dysmorphic–like disorder with actual flaws:** This is similar to Body Dysmorphic Disorder except that the defects or flaws in physical appearance are clearly observable by others (i.e., they are more noticeable than "slight"). In such cases, the preoccupation with these flaws is clearly excessive and causes significant impairment or distress.

2 - **Body dysmorphic–like disorder without repetitive behaviors:** Presentations that meet Body Dysmorphic Disorder except that the individual has not performed repetitive behaviors or mental acts in response to the appearance concerns.

3 - **Body-focused repetitive behavior disorder:** This is characterized by recurrent body-focused repetitive behaviors (e.g., nail biting, lip biting, cheek chewing) and repeated attempts to decrease or stop the behaviors. These symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning and are not better explained by Trichotillomania (hair-pulling disorder), Excoriation (skin-picking) Disorder, or Stereotypic Movement Disorder.

4 - **Obsessional jealousy:** This is characterized by nondelusional preoccupation with a partner's perceived infidelity. The preoccupations may lead to repetitive behaviors or mental acts in response to the infidelity concerns; they cause clinically significant distress or impairment in social, occupational, or other important areas of functioning; and they are not better explained by another mental disorder such as Delusional Disorder, Jealous Type, or Paranoid Personality Disorder.

5 - Situations in which the clinician has concluded that an Obsessive-Compulsive and Related Disorder is present but is **unable to determine whether it is primary or secondary** (i.e., due to another medical condition or is substance/medication-induced).

6 - Other:_____ _____

7 - **Unspecified**: There is insufficient information to make a more specific diagnosis

GO TO NEXT MODULE

GMC/SUBSTANCE CAUSING OBSESSIVE-COMPULSIVE AND RELATED SYMPTOMS

OBSESSIVE-COMPULSIVE AND RELATED DISORDER DUE TO ANOTHER MEDICAL CONDITION

OBSESSIVE-COMPULSIVE AND RELATED DISORDER DUE TO ANOTHER MEDICAL CONDITION CRITERIA

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH A GENERAL MEDICAL CONDITION, CHECK HERE ___ AND GO TO ****SUBSTANCE-INDUCED OC AND RELATED DISORDER**** *G.14.* G28

CODE BASED ON INFORMATION ALREADY OBTAINED

A. Obsessions, compulsions, preoccupations with appearance, hoarding, skin picking, hair pulling, other body-focused repetitive behaviors, or other symptoms characteristic of obsessive-compulsive and related disorder predominate in the clinical picture. ? 1 2 3 G29

GO TO ***SUBSTANCE INDUCED*** G.14

B/C. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of another medical condition AND the disturbance is not better accounted for by another mental disorder. ? 1 3 G30

GO TO ***SUBSTANCE INDUCED*** G.14

Did (OC AND RELATED SXS) **start or get much worse only after** (GMC) **began? How long after** (GMC) **began did** (OC AND RELATED SXS) **start or get much worse?**

IF GMC HAS RESOLVED: **Did the** (OC AND RELATED SYMPTOMS) **get better once the** (GMC) **got better?**

NOTE: The following factors should be considered and, if present, support the conclusion that a general medical condition is etiologic to the obsessive-compulsive and related symptoms.

1) There is evidence from the literature of a well-established association between the general medical condition and the obsessive-compulsive and related symptoms. (Refer to list of etiological general medical conditions on page G.4.)

2) There is a close temporal relationship between the course of the obsessive-compulsive and related symptoms and the course of the general medical condition.

3) The obsessive-compulsive and related symptoms are characterized by unusual presenting features (e.g., late age-at-onset).

4) The absence of alternative explanations (e.g., obsessive-compulsive and related symptoms as a psychological reaction to the stress of being diagnosed with a general medical condition).

IF UNKNOWN: **What effect have** (OC-RELATED SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E.:

How have (OC-RELATED SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (OC-RELATED SXS) **affected your work/school? (How about your attendance at work or school? Have** [OC-RELATED SXS] **made it more difficult to do your work/schoolwork)? How have** [OC-RELATED SXS] **affected the quality of your work/schoolwork?)**

How have (OC-RELATED SXS) **affected your ability to take care of things at home? What about being involved in things that are important to you, like religious activities, physical exercise, or hobbies? Have you avoided situations or people because you didn't want other people to see you doing** (OC-RELATED BEHAVIORS)**?**

Have (OC-RELATED SXS) **affected any other important part of your life?**

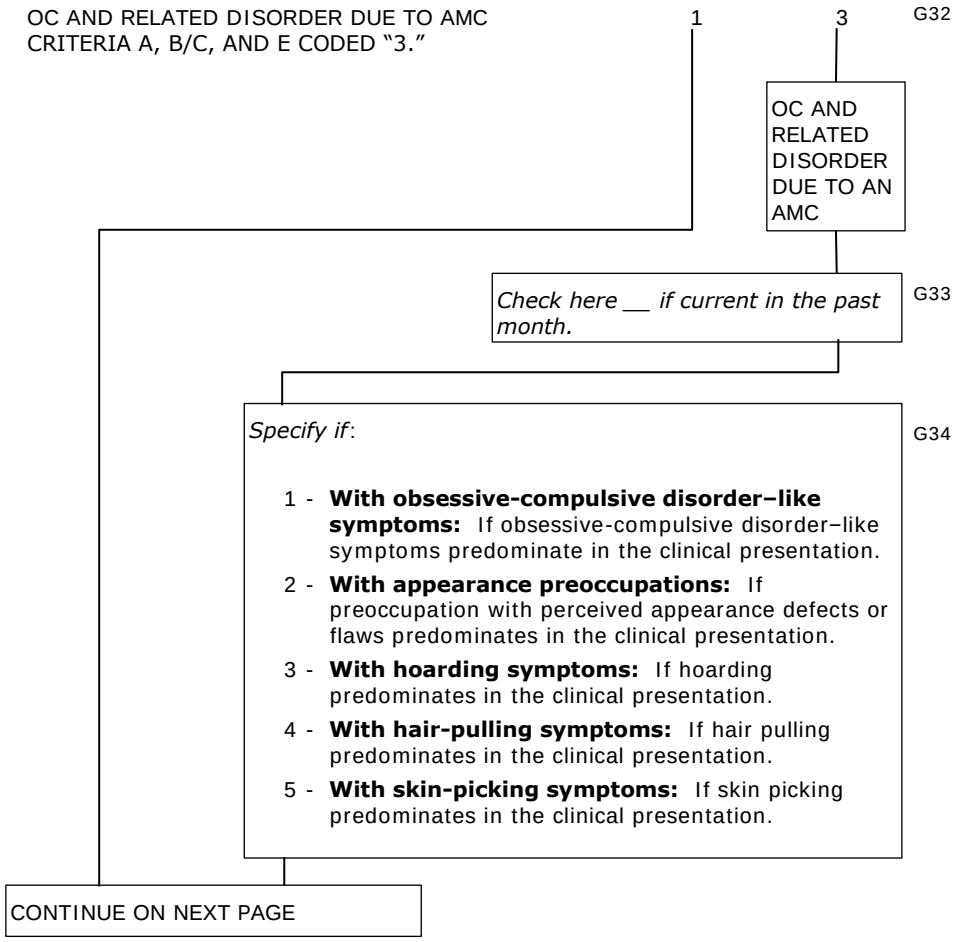
IF HAVE NOT INTERFERED WITH LIFE: **How much have your** (OC-RELATED SXS) **bothered or upset you?**

E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning

? 1 2 3 G31

NOTE: The D criterion (delirium rule-out) has been omitted.

GO TO ***SUB-STANCE INDUCED*** G.14


OC AND RELATED DISORDER DUE TO AMC
CRITERIA A, B/C, AND E CODED "3."
1
3
G32
OC AND RELATED DISORDER DUE TO AN AMC
Check here __ if current in the past month.
G33
Specify if:
1 - With obsessive-compulsive disorder–like symptoms: If obsessive-compulsive disorder–like symptoms predominate in the clinical presentation.
2 - With appearance preoccupations: If preoccupation with perceived appearance defects or flaws predominates in the clinical presentation.
3 - With hoarding symptoms: If hoarding predominates in the clinical presentation.
4 - With hair-pulling symptoms: If hair pulling predominates in the clinical presentation.
5 - With skin-picking symptoms: If skin picking predominates in the clinical presentation.
G34
CONTINUE ON NEXT PAGE

SUBSTANCE-/MEDICATION-INDUCED OC AND RELATED DISORDER

SUBSTANCE-/MEDICATION-INDUCED OC AND RELATED DISORDER CRITERIA

EPISODE BEING EVALUATED:
OCD G.4
Hoarding Opt G.3
Other Specified OCD G.9

IF SYMPTOMS NOT TEMPORALLY ASSOCIATED WITH SUBSTANCE/MEDICATION USE (OR IF SYMPTOMS CONFINED TO HOARDING), CHECK HERE ___ AND RETURN TO EPISODE BEING EVALUATED, CONTINUING WITH THE ITEM FOLLOWING "SYMPTOMS ARE NOT ATTRIBUTABLE TO THE PHYSIOLOGICAL EFFECTS OF A SUBSTANCE OR ANOTHER MEDICAL CONDITION" (SEE PAGE NUMBERS IN BOX TO THE RIGHT). G35

CODE BASED ON INFORMATION ALREADY OBTAINED.

A. Obsessions, compulsions, skin picking, hair pulling, other body-focused repetitive behaviors, or other symptoms characteristic of the obsessive-compulsive and related disorders predominate in the clinical picture. ? 1 2 3 G36

IF NOT KNOWN: **When did the** (OC AND RELATED SXS) **begin? Were you already using** (SUBSTANCE/MEDICATION) **or had you just stopped or cut down your use?**

IF UNKNOWN: **How much** (SUBSTANCE/ MEDICATION) **were you using when you began to have** (OC AND RELATED SXS)**?**

B. There is evidence from the history, physical examination, or laboratory findings of both (1) and (2): ? 1 2 3 G37

1. The symptoms in criterion A developed during or soon after substance intoxication or withdrawal or exposure to a medication
2. The involved substance/ medication is capable of producing the symptoms in Criterion A

NOT SUBSTANCE INDUCED
RETURN TO EPISODE BEING EVALUATED

NOTE: Refer to list of etiological substances/medications on page G.4.

ASK ANY OF THE FOLLOWING QUESTIONS AS NEEDED TO RULE OUT A NON-SUBSTANCE-INDUCED ETIOLOGY.

C. The disturbance is NOT better accounted for by an obsessive-compulsive and related disorder that is not substance-induced. Such evidence of an independent obsessive-compulsive disorder and related disorder could include the following: ? 1 3 G38

RETURN TO EPISODE BEING EVALUATED

IF UNKNOWN: **Which came first, the** (SUBSTANCE/MEDICATION USE) **or the** (OC AND RELATED SXS)**?**

IF UNKNOWN: **Have you had a period of time when you stopped using** (SUBSTANCE/MEDICATION)**?**

IF YES: **After you stopped using** (SUBSTANCE/MEDICATION) **did the** (OC AND RELATED SXS) **go away or get better?**

IF YES: **How long did it take for them to get better? Did they go away within a month of stopping?**

NOTE: The following three statements constitute evidence that the anxiety symptoms are not substance-induced. Code "1" if any are true. Code "3" only if none are true.

The symptoms precede the onset of the substance/medication use;

The symptoms persist for a substantial period of time (e.g., about 1 month) after the cessation of acute withdrawal or severe intoxication;

IF UNKNOWN: **Have you had any other episodes of** (OC AND RELATED SXS)**?**

IF YES: **How many? Were you using** (SUBSTANCE/ MEDICATION) **at those times?**

There is other evidence suggesting the existence of an independent non-substance/medication-induced obsessive-compulsive and related disorder (e.g., a history of recurrent non-substance/ medication-related episodes).

?=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

IF UNKNOWN: **What effect have** (OC-RELATED SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION E:

How have (OC-RELATED SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (OC-RELATED SXS) **affected your work/school? (How about your attendance at work or school? Have** [OC-RELATED SXS] **made it more difficult to do your work/schoolwork)? How have** [OC-RELATED SXS] **affected the quality of your work/schoolwork?)**

How have (OC-RELATED SXS) **affected your ability to take care of things at home? What about being involved in things that are important to you like religious activities, physical exercise, or hobbies? Have you avoided situations or people because you didn't want other people to see you doing** (OC-RELATED BEHAVIOR)?

Have (OC-RELATED SXS) **affected any other important part of your life?**

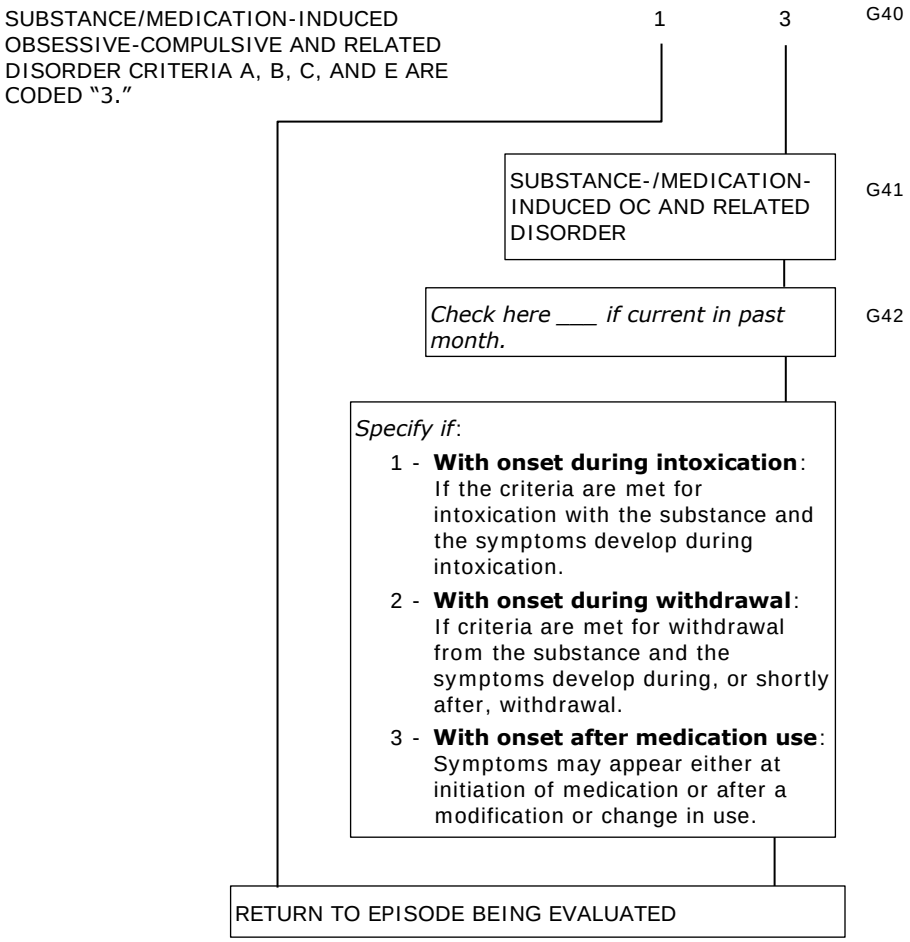
IF HAVE NOT INTERFERED WITH LIFE: **How much have your** (OC-RELATED SXS) **bothered or upset you?**

E. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

NOTE: The D criterion (delirium rule-out) has been omitted.

? 1 2 3 G39

RETURN TO EPISODE BEING EVALUATED


SUBSTANCE/MEDICATION-INDUCED OBSESSIVE-COMPULSIVE AND RELATED DISORDER CRITERIA A, B, C, AND E ARE CODED "3."
1
3
G40
SUBSTANCE-/MEDICATION-INDUCED OC AND RELATED DISORDER
G41
Check here ___ if current in past month.
G42
Specify if:
1 - With onset during intoxication: If the criteria are met for intoxication with the substance and the symptoms develop during intoxication.
2 - With onset during withdrawal: If criteria are met for withdrawal from the substance and the symptoms develop during, or shortly after, withdrawal.
3 - With onset after medication use: Symptoms may appear either at initiation of medication or after a modification or change in use.
RETURN TO EPISODE BEING EVALUATED

Alt-L. TRAUMA AND STRESSOR-RELATED DISORDERS (WITH ALTERNATE DETAILED TRAUMA SCREEN)

I'd now like to ask about some things that may have happened to you that may have been extremely upsetting. People often find that talking about these experiences can be helpful. I'll start by asking if these experiences apply to you, and if so, I'll ask you to briefly describe what happened and how you felt at the time.

SCREEN FOR EACH TYPE OF TRAUMA USING QUESTIONS BELOW; THEN, ON PAGES L.2-L.5 REVIEW AND INQUIRE IN DETAIL FIRST FOR ANY EVENTS OCCURRING IN THE PAST MONTH AND THEN FOR UP TO THREE PAST EVENTS (E.G., THREE WORST EVENTS, THREE MOST RECENT EVENTS, ETC.)

NOTE: BECAUSE THESE CATEGORIES OF TRAUMA MAY OVERLAP, FOR A PARTICULAR TRAUMA, CODE "3" ONLY ONCE (FOR THE FIRST CATEGORY IN WHICH IT APPLIES

1. **Have you ever been in an active war zone, either as military personnel or a civilian?** *IF YES:* **Were you ever in a situation in which you were afraid of dying or being killed? Tell me about that.** *NOTE: HAVING WITNESSED OTHERS HURT OR KILLED IS COVERED BELOW.*	Exposure to war as a combatant or civilian DESCRIBE:	?	1	3	AL1
2. **Have you ever been a prisoner of war? Tell me about that.**	Incarceration as a prisoner of war DESCRIBE:	?	1	3	AL2
3. **Have you ever been tortured? Tell me about that.**	Victim of torture DESCRIBE:	?	1	3	AL3
4. **Have you ever been kidnapped, abducted, or taken hostage? Tell me about that.**	Being kidnapped or taken hostage DESCRIBE:	?	1	3	AL4
5. **Have you ever been a victim of a terrorist attack? Tell me about that.**	Victim of terrorist attack DESCRIBE:	?	1	3	AL5
6. **Have you ever been in a natural disaster in which you could have died, such as a flood, hurricane, tornado, or earthquake? What happened?**	Exposure to natural or human-made disasters or a fire or explosion DESCRIBE:	?	1	3	AL6
7. **Have you ever been in a fire or explosion or a serious industrial accident? What happened?**					

8. **Have you ever been in a serious car accident? What happened?**	Severe motor vehicle or transportation accidents	?	1	3	AL7
9. **How about other serious accidents, such as a boat accident, train wreck, or a plane crash? What happened?**	DESCRIBE:				
10. **Have you ever had a serious accident at work or home? What happened?**	Having a serious accident at work, home, or during recreational activity	?	1	3	AL8
11. **How about having a serious accident that involved a recreational activity, like, playing football, skiing, or horseback riding? What happened?**	DESCRIBE:				
12. **Have you ever been beaten up, robbed or mugged? What happened?**	Threatened or actual physical assault (e.g., physical attack, domestic violence, robbery, mugging, childhood physical abuse)	?	1	3	AL9
13. **Have you ever been hit, slapped, or kicked by a spouse or partner, or a family member? Tell me about that.**	DESCRIBE:				
14. **Has anyone ever threatened to hurt or kill you with a weapon? Tell me about that.**					
15. **When you were a child, were you physically abused by anyone, like a parent, caretaker, relative, or teacher?'**					
16. **Have you ever been a victim of sexual violence, like rape or attempted rape? What happened?**	Threatened or actual sexual violence (e.g., forced sexual penetration, alcohol/drug-facilitated sexual penetration, abusive sexual contact, noncontact sexual abuse, sexual trafficking).	?	1	3	AL10
17. **Have you ever been forced to perform any type of sexual act? What happened?**	DESCRIBE:				
18. **Were you ever raped or sexually assaulted while drugged or drunk? What happened?**					
19. **Has anyone ever threatened to rape or otherwise sexually assault you? What happened?**					
20. **When you were a child, did you have any kind of unwanted or uncomfortable sexual experience? Tell me about that.**	In children, sexually violent events may include developmentally inappropriate sexual experiences without physical violence or injury.	?	1	3	AL11
	DESCRIBE:				

21. **Ever have any terrifying medical experiences such as waking during surgery or having a severe allergic reaction in which you couldn't breathe? Tell me about that.**	Medical incidents that qualify as traumatic events involve sudden, catastrophic events (e.g., waking during surgery, anaphylactic shock). (A life-threatening illness or debilitating medical condition is not necessarily considered a traumatic event.) DESCRIBE:	?	1	3	AL12
22. **Did you ever see someone being seriously injured or killed? Tell me about that.** 23. **Did you ever see someone being physically or sexually abused? Tell me about that.** 24. **How about witnessing a serious accident? What happened?** 25. **Ever witness a life threatening medical event happen to someone close to you, like needing to be resuscitated? What happened?**	Witnessed events include, but are not limited to, observing threatened or serious injury, unnatural death, physical or sexual abuse of another person due to violent assault, domestic violence, accident, war or disaster, or a medical catastrophe in one's child (e.g., life-threatening hemorrhage). DESCRIBE:	?	1	3	AL13
26. **What about finding out that someone close to you was murdered, raped, or assaulted? What about finding out that someone close to you was hurt or killed in an accident? Tell me about that.** 27. **How about learning that someone close to you committed suicide? What happened?**	Indirect exposure through learning about an event is limited to experiences affecting close relatives or friends and experiences that are violent or accidental (e.g., death due to natural causes does not qualify). Such events include violent personal assault, suicide, serious accident, and serious injury. DESCRIBE:	?	1	3	AL14
28. **Have you ever had a job that involved being exposed to extremely upsetting things, like collecting human remains, going over crime scenes, or investigating child abuse? What happened?**	Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse. DESCRIBE:	?	1	3	AL15
IF NO EVENTS ENDORSED: **What would you say has been the most stressful or traumatic experience you have had over your life?**	DESCRIBE:	?	1	3	AL16

IF NO EVENTS CODED "3," CHECK HERE ___ AND GO TO ****ADJUSTMENT DISORDER**** *L.20.*
OTHERWISE CONTINUE ON NEXT PAGE. AL17

Did any of these happen in the past month, since (1 MONTH AGO)**?**

→ *IF YES*: *ASSESS THE TRAUMATIC EVENT IN PAST MONTH USING THE QUESTIONS BELOW.*

→ *IF NO: CONTINUE ON TOP OF PAGE L.3.*

DETAILS FOR EVENT IN PAST MONTH

→ IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

→ IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT)**? Were you concerned about your own safety?**

→ IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

Description of traumatic event:

_____ L9

_____

*Indicate **type of traumatic event**:* (check all that apply)

___ Death, actual L10

___ Death, threatened L11

___ Serious Injury, actual L12

___ Serious injury, threatened L13

___ Sexual violence, actual L14

___ Sexual violence, threatened L15

*Indicate **mode of exposure** to traumatic event:* (check all that apply)

___ Directly experienced L16

___ Witnessed happening to others in person L17

___ Learning about actual or threatened violence or accidental death of a close family member or friend L18

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L19

IF UNKNOWN: **How old were you at the time?**

Age at time of event: ____ L20

IF UNKNOWN: **Did this happen more than once?**

*Indicate **type of exposure**:* (circle the appropriate number)

1 – Single event L21

2 – Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years

IF NO EVENTS PRIOR TO PAST MONTH, GO TO ***ACUTE STRESS DISORDER*** *L.6.*

IF EVENTS PRIOR TO PAST MONTH, REVIEW THE TYPES OF TRAUMA INDICATED ON SCREENING (PAGE L.1 IN THE STANDARD VERSION OF MODULE L OR PAGES ALT-L.1 THROUGH ALT-L3 IN THE ALTERNATE VERSION) AND CHOOSE THE THREE MOST SEVERE EVENTS TO ASSESS, USING THE FOLLOWING QUESTIONS:

DETAILS FOR PAST EVENT #1

IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT)**? Were you concerned about your own safety?**

IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

IF UNKNOWN: **How old were you at the time?**

IF UNKNOWN: **Did this happen more than once?**

Description of traumatic event**:**

_____ L22
_____

Indicate ***type of traumatic event****:* (check all that apply)

___ Death, actual L23

___ Death, threatened L24

___ Serious Injury, actual L25

___ Serious injury, threatened L26

___ Sexual violence, actual L27

___ Sexual violence, threatened L28

Indicate ***mode of exposure*** *to traumatic event:* (check all that apply)

___ Directly experienced L29

___ Witnessed happening to others in person L30

___ Learning about actual or threatened violence or accidental death of a close family member or friend L31

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L32

Age at time of event: ____ L33

Indicate ***type of exposure****:* (circle the appropriate number)

1 – Single event L34

2 – Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years)

DETAILS FOR PAST EVENT #2

IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT**)? Were you concerned about your own safety?**

IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

Description of traumatic event**:**

_____ L35

_____

*Indicate **type of traumatic event**:* (check all that apply)

___ Death, actual L36

___ Death, threatened L37

___ Serious Injury, actual L38

___ Serious injury, threatened L39

___ Sexual violence, actual L40

___ Sexual violence, threatened L41

*Indicate **mode of exposure** to traumatic event*: (check all that apply)

___ Directly experienced L42

___ Witnessed happening to others in person L43

___ Learning about actual or threatened violence or accidental death of a close family member or friend L44

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L45

IF UNKNOWN: **How old were you at the time?**

Age at time of event: ____ L46

IF UNKNOWN: **Did this happen more than once?**

*Indicate **type of exposure**:* (circle the appropriate number)

1 – Single event L47

2 – Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years

DETAILS FOR PAST EVENT #3

IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT)**? Were you concerned about your own safety?**

IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

IF UNKNOWN: **How old were you at the time?**

IF UNKNOWN: **Did this happen more than once?**

Description of traumatic event:

_____
_____

L48

*Indicate **type of traumatic event**:* (check all that apply)

___ Death, actual L49

___ Death, threatened L50

___ Serious Injury, actual L51

___ Serious injury, threatened L52

___ Sexual violence, actual L53

___ Sexual violence, threatened L54

*Indicate **mode of exposure** to traumatic event:* (check all that apply)

___ Directly experienced L55

___ Witnessed happening to others in person L56

___ Learning about actual or threatened violence or accidental death of a close family member or friend L57

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L58

Age at time of event: ____ L59

*Indicate **type of exposure**:* (circle the appropriate number)

1 – Single event L60

2 – Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years

ACUTE STRESS DISORDER (CURRENT ONLY)

ACUTE STRESS DISORDER CRITERIA (PAST MONTH)

*IF NO EVENTS IN PAST MONTH, CHECK HERE ___ AND GO TO ***POSTTRAUMATIC STRESS DISORDER**** *L.11* L61

REVIEW TRAUMATIC EVENTS OCCURRING IN THE PAST MONTH DESCRIBED IN DETAIL ON PAGE L.2.

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

IF MORE THAN ONE TRAUMATIC EVENT IS REPORTED IN THE PAST MONTH: **Which of these do you think has affected you the most in the past month, since** (1 MONTH AGO)**?**

1. Directly experiencing the traumatic event(s). ? 1 2 3 L62
2. Witnessing, in person, the event(s) as it occurred to others. ? 1 2 3 L63
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental. ? 1 2 3 L64
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse) ? 1 2 3 L65

Note: Criterion A.4 does not apply to exposure through electronic media, television, movies, or pictures, unless the exposure is work-related.

AT LEAST ONE A ITEM CODED "3" 1 3 L66

GO TO ***PTSD*** L.11

Now I'd like to ask a few questions about specific ways that (TRAUMATIC EVENT) **may have affected you.**

B. Presence of NINE (or more) of the following symptoms FROM ANY OF THE FIVE CATEGORIES (intrusion, negative mood, dissociation, avoidance, and arousal), beginning or worsening after the traumatic event(s) occurred:

Since (1 MONTH AGO)**...**

...have you had memories of (TRAUMATIC EVENT)**, including feelings, physical sensations, sounds, smells, or images, when you didn't expect to or want to? (How often has this happened?)**

1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). ? 1 2 3 L67

...what about having upsetting dreams that remind you of (TRAUMATIC EVENT)**? Tell me about that.**

2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event. ? 1 2 3 L68

Since (1 MONTH AGO)**...** **...what about finding yourself acting or feeling as if you were back in the situation? (Have you had "flashbacks" of** [TRAUMATIC EVENT]**?)**	3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)	?	1	2	3	L69
...have you had a strong emotional or physical reaction when something reminded you of (TRAUMATIC EVENT)**? Give me some examples of the kinds of things that would trigger this reaction. (Things like...seeing a person who resembles the person who attacked you, hearing the screech of brakes if you were in a car accident, hearing the sound of helicopters if you were in combat, any kind of physically intimacy in someone who was raped?)** *IF YES:* **What kind of reaction did you have? Did you get very upset or stay upset for a while, even after the reminder had gone away? (What about having physical symptoms--like breaking out in a sweat, breathing heavily or irregularly, or feeling your heart pound or race when something reminded you of** [TRAUMATIC EVENT]**? How about feeling tense or shaky?)**	4. Intense or prolonged psychological distress or marked physiological reactions in response to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).	?	1	2	3	L70
...have you been unable to experience good feelings, like feeling happy, joyful, satisfied, loving, or tender towards other people? *IF YES:* **Is this different from the way you were before** (TRAUMATIC EVENT)**?**	5. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).	?	1	2	3	L71
...have you had the feeling that you were in a daze, that everything was unreal or that you were in a dream, that you were detached from your own body or mind, that time was moving more slowly, or that you were an outside observer of your own thoughts or movements?	6. An altered sense of reality of one's surroundings or one's self (e.g., seeing oneself from another's perspective, being in a daze, time slowing).	?	1	2	3	L72
...have you been unable to remember some important part of what happened? *IF YES:* **Did you get a head injury during** (TRAUMATIC EVENT)**? Were you drinking a lot or were you taking any drugs at the time of** (TRAUMATIC EVENT)**?**	7. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).	?	1	2	3	L73
...have you done things to avoid remembering or thinking about (TRAUMATIC EVENT) **like keeping yourself busy, distracting yourself like by playing computer or video games or watching TV, or using drugs or alcohol to "numb" yourself or to try to forget what happened?** *IF NO:* **How about doing things to avoid having feelings similar to those you had during** (TRAUMATIC EVENT)**?**	8. Efforts to avoid distressing memories, thoughts, or feelings about or closely related with traumatic event(s).	?	1	2	3	L74

Since (1 MONTH AGO)**...**

...have there been things, places, or people that you have tried to avoid because it brought up upsetting memories, thoughts, or feelings about (TRAUMATIC EVENT)**?**

IF NO: **How about avoiding certain activities, situations, or topics of conversation?**

9. Efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s). ? 1 2 3 L75

...how have you been sleeping since (TRAUMATIC EVENT)**? (Is this a change from before** [TRAUMATIC EVENT]**?)**

10. Sleep disturbances (e.g., difficulty falling or staying asleep or restless sleep). ? 1 2 3 L76

...have you lost control of your anger, so that you threatened or hurt someone or damaged something? Tell me what happened. (Was it over something little or even nothing at all?)

IF NO: **Since** (TRAUMATIC EVENT)**, have you been more quick-tempered or had a shorter "fuse" than before?**

IF YES TO EITHER: **How different is this from the way you were before** (TRAUMATIC EVENT)**?**

11. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects. ? 1 2 3 L77

...have you noticed that you have been more watchful or on guard since (TRAUMATIC EVENT)**? (What are some examples?)**

IF NO: **Have you been extra aware of your surroundings and your environment?**

12. Hypervigilance. ? 1 2 3 L78

...have you had trouble concentrating? (What are some examples? Is this a change from before [TRAUMATIC EVENT]**?)**

13. Problems with concentration. ? 1 2 3 L79

...have you been jumpy or easily startled, like by sudden noises? (Is this a change from before [TRAUMATIC EVENT]**?)**

14. Exaggerated startle response. ? 1 2 3 L80

AT LEAST NINE "B" SXS ARE CODED "3." 1 3 L81

GO TO ***PTSD*** L.11

About how long did ("B" SXS CODED "3") **last altogether?**

C. Duration of the disturbance (symptoms in Criterion B) is 3 days to 1 month after trauma exposure. ? 1 2 3 L82

GO TO ***PTSD*** L.11

IF UNKNOWN: **What effect have** (ASD SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION D:

How have (ASD SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (ASD SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have they affected your ability to take care of things at home? What about being involved in things that are important to you, like religious activities, physical exercise, or hobbies?

Have (ASD SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by** (ASD SXS)**?**

D. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 L83

GO TO ***PTSD*** L.11

Did (TRAUMATIC EVENT) **cause any injury to your head or brain?**

Have you been drinking a lot or using a lot of drugs since (TRAUMATIC EVENT)**? Tell me about that. (How much have you been [drinking/using (**DRUG[S]**)? (Do you think your problems since** [TRAUMATIC EVENT] **are more due to your [drinking/**(DRUG) **use] rather than to your reaction to** [TRAUMATIC EVENT] **itself?)**

IF PSYCHOTIC: **Have you had** (ASD SXS) **only when you were** (PSYCHOTIC SXS)**?**

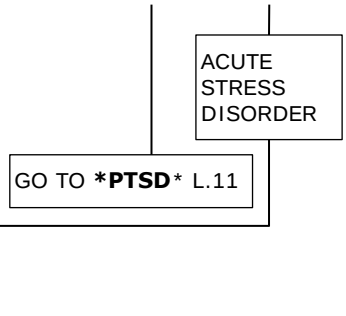
E. The disturbance is not attributable to the physiological effects of a substance (e.g., medication or alcohol) or another medical condition (e.g., mild traumatic brain injury) and is not better explained by Brief Psychotic Disorder.

1 3 L84

GO TO ***PTSD*** L.11

ACUTE STRESS DISORDER CRITERIA A, B, C, D, AND E ARE CODED "3."

1 3 L85



Specify if:

L86

IF UNKNOWN: H**ave you had any panic attacks in the past month?**

___ **With panic attacks**: if one or more panic attacks in the past month occurring in the context of current Acute Stress Disorder (see page F.7) and criteria have never been met for Panic Disorder.

POSTTRAUMATIC STRESS DISORDER

POSTTRAUMATIC STRESS DISORDER CRITERIA

FOR FOLLOWING QUESTIONS, FOCUS ON THE THREE MOST SEVERE TRAUMATIC EVENT(S) DESCRIBED ON PAGES L.3–L.5.

*IF ALL TRAUMAS ARE CONFINED TO THE PAST MONTH, CHECK HERE __ AND SKIP TO ***ADJUSTMENT DISORDER**** *PAGE L.20.* L87

.

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

IF MORE THAN ONE TRAUMATIC EVENT IS REPORTED: **Which of these do you think affected you the most?**

IF SELECTED EVENT IS ULTIMATELY NOT ASSOCIATED WITH THE FULL PTSD SYNDROME, CONSIDER RE-ASSESSING THE ENTIRE PTSD CRITERIA SET (PAGES L.11–L.17) FOR OTHER REPORTED TRAUMAS.

1. Directly experiencing the traumatic event(s). ? 1 2 3 L88

2. Witnessing, in person, the event(s) as it occurred to others. ? 1 2 3 L89

3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental. ? 1 2 3 L90

4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). ? 1 2 3 L91

Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless the exposure is work-related.

AT LEAST ONE A ITEM CODED "3" 1 3 L92

→ GO TO ***ADJUSTMENT DISORDER**** L.20

Now I'd like to ask a few questions about specific ways that (TRAUMATIC EVENT) **may have affected you at any time since** (TRAUMATIC EVENT).

B. Presence of one (or more) of the following intrusion symptoms associated with the traumatic events), beginning after the traumatic event(s) occurred:

For example, since (TRAUMATIC EVENT)**....**

1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). ? 1 2 3 L93

...have you had memories of (TRAUMATIC EVENT)**, including feelings, physical sensations, sounds, smells, or images, when you didn't expect to or want to? (How often has this happened?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

→ Past month ? 1 2 3 L94

...what about having upsetting dreams that reminded you of (TRAUMATIC EVENT)**? Tell me about that.**

2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event. ? 1 2 3 L95

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

→ Past month ? 1 2 3 L96

Since (TRAUMATIC EVENT)**...**

...what about having found yourself acting or feeling as if you were back in the situation? (Have you had "flashbacks' of [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)

? 1 2 3 L97

Past month ? 1 2 3 L98

...have you had a strong emotional or physical reaction when something reminded you of (TRAUMATIC EVENT)**? Give me some examples of the kinds of things that would have triggered this reaction. (Things like...seeing a person who resembles the person who attacked you, hearing the screech of brakes if you were in a car accident, hearing the sound of helicopters if you were in combat, any kind of physically intimacy in someone who was raped?)**

NOTE: IF DENIES EMOTIONAL OR PHYSICAL REACTION TO REMINDERS, CODE "1" FOR BOTH B.4 (EMOTIONAL REACTION) AND B.5 (PHYSICAL REACTION).

IF YES: **What kind of reaction did you have? Did you get very upset or stay upset for a while, even after the reminder had gone away?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

? 1 2 3 L99

Past month ? 1 2 3 L100

IF ACKNOWLEDGES STRONG EMOTIONAL OR PHYSICAL REACTION: **What about having physical symptoms—like breaking out in a sweat, breathing heavily or irregularly, or feeling your heart pound or race when something reminded you of** (TRAUMATIC EVENT)**? How about feeling tense or shaky?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

? 1 2 3 L101

Past month ? 1 2 3 L102

AT LEAST ONE "B" SX IS CODED "3." 1 3 L103

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION B MET PAST MONTH: 1 3 L104

=inadequate information 1=absent or false 2=subthreshold 3=threshold or true

Since (TRAUMATIC EVENT)**...**

C. Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:

...have you done things to avoid remembering or thinking about (TRAUMATIC EVENT) **like keeping yourself busy, distracting yourself like by playing computer or video games or watching TV, or using drugs or alcohol to "numb" yourself or try to forget what happened? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF NO: **How about doing things to avoid having feelings similar to those you had during** (TRAUMATIC EVENT)**? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

1. Avoidance of, or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

? 1 2 3 L105

Past month
? 1 2 3 L106

...have there been things, places, or people that you have tried to avoid because it brought up upsetting memories, thoughts, or feelings about (TRAUMATIC EVENT)**? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF NO: **How about avoiding certain activities, situations, or topics of conversation? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations), that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

? 1 2 3 L107

Past month
? 1 2 3 L108

AT LEAST ONE "C" SX IS CODED "3."

1 3 L109

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION C MET PAST MONTH:
1 3 L110

Since (TRAUMATIC EVENT)**...**

D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following**:**

...have you been unable to remember some important part of what happened? (Tell me about that.)

IF YES: **Did you get a head injury during** (TRAUMATIC EVENT)**? Were you drinking a lot or were taking any drugs at the time of** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).

? 1 2 3 L111

Past month ? 1 2 3 L112

...has there been a change in how you think about yourself? (Like feeling you are "bad," or permanently damaged or "broken?" Tell me about that. Since this started, have you felt this way most of the time?)

IF NO: **Has there been a change in how you see other people or the way the world works? (Like you can't trust anyone anymore? Like the world is a completely dangerous place? Tell me about that. Since this started, have you felt this way most of the time?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How much of the time?**

2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad," "No one can be trusted," "The world is completely dangerous," "My whole nervous system is permanently ruined").

? 1 2 3 L113

Past month ? 1 2 3 L114

...have you blamed yourself for the (TRAUMATIC EVENT) **or how it affected your life? (Like feeling that** (TRAUMATIC EVENT) **was your fault or that you should have done something to prevent it? Like feeling that you should have gotten over it by now?)**

→ *IF YES:* **Tell me about that. (Since this started, have you felt this way most of the time?)**

→ IF NO: **Have you blamed someone else for** (TRAUMATIC EVENT)**? Tell me about that. (What did they have to do with** [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How much of the time?**

3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.

? 1 2 3 L115

Past month ? 1 2 3 L116

...have you had bad feelings much of the time, like feeing sad, angry, afraid, guilty, ashamed, "in shock"? (Tell me about that.)

IF YES: **Is this different from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).

? 1 2 3 L117

Past month ? 1 2 3 L118

Since (TRAUMATIC EVENT**)...**

L119

...have you been less interested in things that you were interested in before (TRAUMATIC EVENT)**, like spending time with family or friends, reading books, watching TV, cooking, or sports? (Tell me about that.)**

IF NO LOSS OF INTEREST: **Are you still doing as many activities as you used to?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

5. Markedly diminished interest or participation in significant activities. ? 1 2 3

Past month ? 1 2 3 L120

...have you felt distant or disconnected from others or have you closed yourself off from other people? (Tell me about that.)

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)? **How often?**

6. Feelings of detachment or estrangement from others. ? 1 2 3 L121

Past month ? 1 2 3 L122

...have you been unable to experience good feelings, like feeling happy, joyful, satisfied, loving, or tender towards other people? (Tell me about that.)

IF YES: **Is this different from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings). ? 1 2 3 L123

Past month ? 1 2 3 L124

AT LEAST THREE "D" SXS ARE CODED "3." 1 3 L125

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION D MET PAST MONTH: 1 3 L126

Since (TRAUMATIC EVENT)**...**

E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

...have you lost control of your anger, so that you threatened or hurt someone or damaged something? Tell me what happened. (Was it over something little or even nothing at all?)

IF NO: **Since** (TRAUMATIC EVENT)**, have you been more quick-tempered or had a shorter "fuse" than before?**

IF YES TO EITHER: **How different is this from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How often?**

1. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects. ? 1 2 3 L127

Past month ? 1 2 3 L128

Since (TRAUMATIC EVENT**)...**

...have you done reckless things, like driving dangerously, or drinking or using drugs without caring about the consequences?

IF NO: **How about hurting yourself on purpose or trying to kill yourself? (What did you do?)**

IF YES TO EITHER: **How different is this from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

2. Reckless or self-destructive behavior.

NOTE: Any current suicidal thoughts, plans, or actions should be thoroughly assessed by the clinician and action taken if necessary.

? 1 2 3 L129

Past month
? 1 2 3 L130

...have you noticed that you have been more watchful or on guard? (What are some examples?)

IF NO: **Have you been extra aware of your surroundings and your environment?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How often?**

3. Hypervigilance.

? 1 2 3 L131

Past month
? 1 2 3 L132

...have you been jumpy or easily startled, like by sudden noises? (Is this a change from before [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

4. Exaggerated startle response.

? 1 2 3 L133

Past month
? 1 2 3 L134

...have you had trouble concentrating? (What are some examples? (Is this a change from before [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

5. Problems with concentration.

? 1 2 3 L135

Past month
? 1 2 3 L136

...how have you been sleeping since (TRAUMATIC EVENT)**? (Is this a change from before** [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

6. Sleep disturbances (e.g., difficulty falling or staying asleep or restless sleep).

? 1 2 3 L137

Past month
? 1 2 3 L138

AT LEAST TWO "E" SXS ARE CODED "3."

1 3 L139

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION E MET PAST MONTH
1 3 L140

About how long did these (PTSD SYMPTOMS CODED "3") **last altogether?**

F. Duration of the disturbance (symptoms in criteria B, C, D, and E) is more than 1 month.

? 1 2 3 L141

GO TO ***ADJUSTMENT DISORDER*** L.20

IF UNKNOWN: **What effect did** (PTSD SXS) **have on your life?**

G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 L142

GO TO ***ADJUSTMENT DISORDER*** L.20

ASK THE FOLLOWING QUESTIONS <u>AS NEEDED</u> TO RATE CRITERION G:

How have (PTSD SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

CRITERION H HAS BEEN OMITTED.

How have (PTSD SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have they affected your ability to take care of things at home? What about being involved in things that are important to you like religious activities, physical exercise, or hobbies?

Have (PTSD SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by** (PTSD SXS)**?**

IF LIFETIME RATING OF "3": **How have** (PTSD SXS) **affected your life in the past month, since** (1 MONTH AGO)**?**

CRITERION G MET PAST MONTH
? 1 2 3

L143

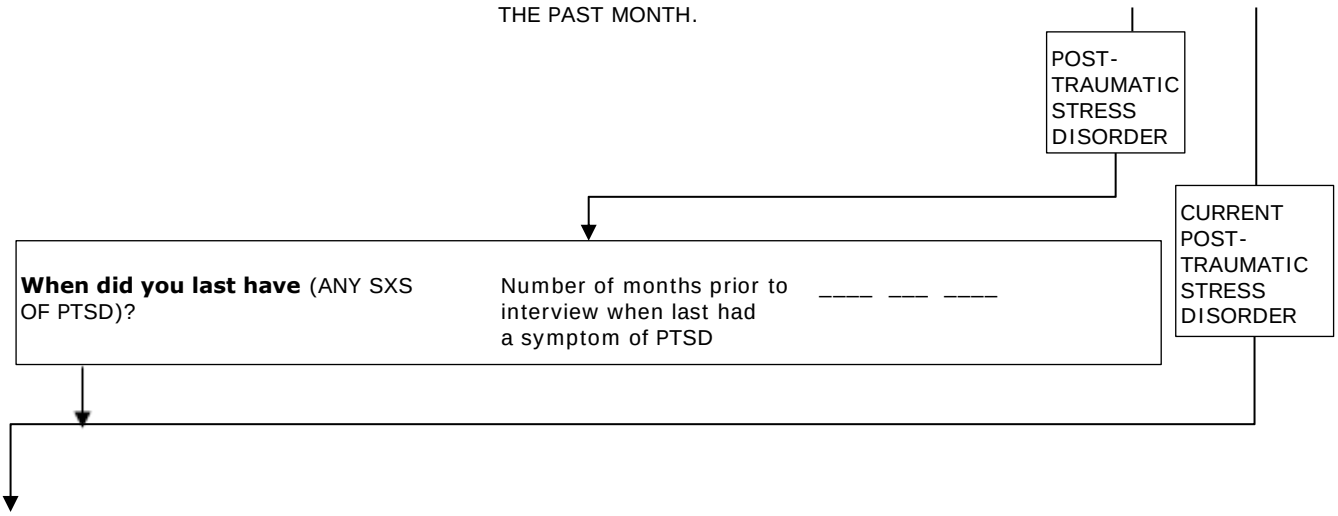
POSTTRAUMATIC STRESS DISORDER CRITERIA A, B, C, D, E, F, AND G ARE CODED "3."

1 3 L144

GO TO ***ADJUSTMENT DISORDER*** L.20

POST-TRAUMATIC STRESS DISORDER

PTSD CRITERIA B, C, D, E, AND G MET FOR THE PAST MONTH. ? 1 3 L145



IF UNKNOWN: **How old were you when you first started having** (SXS OF PTSD)**?**

Age at onset of Posttraumatic Stress Disorder (CODE 99 IF UNKNOWN). ____ ____ L147

IF POSTTRAUMATIC STRESS DISORDER IS NOT CURRENT, GO TO ****ADJUSTMENT DISORDER**** *L.20.*

IF UNKNOWN: **Did most of these problems begin soon after** (TRAUMA)**?**

Specify if:

IF NO: **How much time was it from the** (TRAUMA) **and when you had most of these problems? (Was it less than 6 months?)**

____ **With delayed expression:** If the full diagnostic criteria are not met until at least 6 months after the event (although the onset and expression of some symptoms may be immediate). L148

While you had these problems, did you also often have the feeling that everything was unreal or that you were in a dream, you were detached from your body or mind, that time was moving slowly, or that you were an outside observer of your own thoughts or movements?

IF YES: **Does this occur at times other than when you are using drugs or alcohol? Does this occur at times other than during a seizure?**

*Indicate **type***: (circle the appropriate number)

1 – **With dissociative symptoms**: L149

The individual's symptoms meet the criteria for Posttraumatic Stress Disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

Depersonalization: Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).

Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).

Note: To use this subtype, the dissociative symptoms must not be attributable to the physiological effects of a substance (e.g., blackouts, behavior during alcohol intoxication) or another medical condition (e.g., complex partial seizures).

2 – **Without dissociative symptoms**: If neither 1 nor 2 above.

Specify if:

IF UNKNOWN: **Have you had any panic attacks in the past month?**

___ With panic attacks: if one or more panic attacks in the past month occurring in the context of current Posttraumatic Stress Disorder (see page F.7) and criteria have never been met for Panic Disorder. L150

ADJUSTMENT DISORDER (CURRENT ONLY)

*CONSIDER THIS SECTION ONLY IF THERE ARE SYMPTOMS OCCURRING IN THE PAST 6 MONTHS THAT DO NOT MEET THE CRITERIA FOR ANOTHER DSM-5 DISORDER. OTHERWISE, CHECK HERE ___ AND GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER*** L.23. INFORMATION OBTAINED FROM OVERVIEW OF PRESENT ILLNESS WILL USUALLY BE SUFFICIENT TO RATE THE CRITERIA FOR ADJUSTMENT DISORDER.* L151

ADJUSTMENT DISORDER CRITERIA

IF UNKNOWN: **Did anything happen to you before** (SYMPTOMS) **began?**

IF YES: **Tell me about what happened. Do you think that** (STRESSOR) **had anything to do with your developing** (SXS)?

→ *IF SINGLE EVENT*: **How long after** (STRESSOR) **did you first develop** (SXS)**? (Was it within 3 months?)**

→ *IF CHRONIC STRESSOR:* **How long after** (STRESSOR) **began did you first develop** (SXS)? **(Was it within 3 months?)**

A. The development of emotional or behavioral symptoms in response to an identifiable stressor(s) occurring within 3 months of the onset of the stressor(s).

DESCRIBE SYMPTOMS:

DESCRIBE STRESSOR:

? 1 2 3 L152

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

IF UNKNOWN: **What effect did** (SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION B:

How have (SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (SXS) **affected your work/school? (How about your attendance at work or school? Did** [SXS] **make it more difficult to do your work/schoolwork? How did** [SXS] **affect the quality of your work/schoolwork?)**

How have they affected your ability to take care of things at home? What about being involved in things that are important to you like religious activities, physical exercise, or hobbies?

Have (SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by having** (SXS)**? How upset are you about** (STRESSOR)**? (Are you more upset than most other people would be? Have others said that you're more upset than you should be? Have** [SXS] **lasted longer than you or other people think they should have?)**

B. These symptoms or behaviors are clinically significant as evidenced by one or both of the following:

1. Marked distress that is out of proportion to the severity and intensity of the stressor, taking into account the external context and the cultural factors that might influence symptom severity and presentation.

2. Significant impairment in social, occupational, or other important areas of functioning.

? 1 2 3 L153

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

Have you had this kind of reaction many times before?

IF UNKNOWN: **Were you having these** (SXS) **even before** (STRESSOR) **happened?**

C. The stress-related disturbance does not meet the criteria for another mental disorder and is not merely an exacerbation of a preexisting mental [including personality] disorder.

? 1 3 L154

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

IF UNKNOWN: **Did someone close to you die just before** (SXS)**?**

D. The symptoms do not represent normal bereavement.

? 1 3 L155

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

IF UNKNOWN: **How long has it been since** (STRESSOR AND ITS CONSEQUENCES) **was over?**

E. Once the stressor (or its consequences) has terminated, the symptoms do not persist for more than an additional 6 months.

? 1 2 3 L156

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

ADJUSTMENT DISORDER CRITERIA A, B, C, D, AND E ARE CODED "3" DURING THE PAST 6 MONTHS. 3 1 L157

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

CURRENT ADJUST-MENT DISORDER

*Indicate **type** based on predominant symptoms:* (circle the appropriate number) L158

1 – **With depressed mood:** Low mood, tearfulness, or feelings of hopelessness are predominant.

2 – **With anxiety:** Nervousness, worry, jitteriness, or separation anxiety is predominant.

3 – **With mixed anxiety and depressed mood:** A combination of depression and anxiety is predominant.

4 – **With disturbance of conduct:** Disturbance in conduct is predominant.

5 – **With mixed disturbance of emotions and conduct:** Both emotional symptoms (e.g., depression, anxiety) and a disturbance of conduct are predominant.

6 – **Unspecified:** For maladaptive reactions that are not classifiable as one of the specific subtypes of adjustment disorder (e.g., physical complaints, social withdrawal, or work or academic inhibition).

IF UNKNOWN: **When did** (SXS) **begin?**

Specify if: (circle the appropriate number) L159

1 - **Acute:** if the disturbance lasts less than 6 months.

2 - **Persistent (chronic):** if the disturbance lasts for 6 months or longer.

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** NEXT PAGE

OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER

OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER

Symptoms characteristic of a Trauma- and Stressor-Related Disorder predominate but do not meet the full criteria for any of the disorders in the Trauma- and Stressor-Related Disorders diagnostic class

1 → END OF SCID

3 L160

IF UNKNOWN: **What effect did** (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION:

How did (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect your relationships or your interactions with other people? (Did** [SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER] **cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect your school/work? (How about your attendance at work or school? Did** [SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER] **make it more difficult to do your work/schoolwork? How did** [SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER] **affect the quality of your work/schoolwork?)**

How did (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Did your (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much were you bothered or upset by having** (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER)**?**

[Symptoms] that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning

1 → END OF SCID

3 → OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER

L161

IF UNCLEAR: **During the past month, have you had** (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER)**?**

Check here ___ if present in last month. L162

*Indicate **type** of Other Specified Trauma- and Stressor-related Disorder*: L163
(circle the appropriate number)

1 – Adjustment-like disorders with delayed onset of symptoms that **occur more than 3 months after the stressor**.

2 – Adjustment-like disorders **with prolonged duration of more than 6 months** without prolonged duration of stressor

3 – **Persistent complex bereavement disorder:** This disorder is characterized by severe and persistent grief and mourning reactions

4 – **Other**: _____

END OF SCID

L. TRAUMA- AND STRESSOR-RELATED DISORDERS

TRAUMA HISTORY

I'd now like to ask about some things that may have happened to you that may have been extremely upsetting. People often find that talking about these experiences can be helpful. I'll start by asking if these experiences apply to you, and if so, I'll ask you to briefly describe what happened and how you felt at the time.

SCREEN FOR EACH TYPE OF TRAUMA USING QUESTIONS BELOW; THEN, ON PAGES L.2–L.5 REVIEW AND INQUIRE IN DETAIL FIRST FOR ANY EVENTS OCCURRING IN THE PAST MONTH AND THEN FOR UP TO THREE PAST EVENTS (E.G., THREE WORST EVENTS, THREE MOST RECENT EVENTS, ETC.)

Have you ever been in a life threatening situation like a major disaster or fire, combat, or a serious car or work-related accident? L1

What about being physically or sexually assaulted or abused, or threatened with physical or sexual assault? L2

How about seeing another person being physically or sexually assaulted or abused, or threatened with physical or sexual assault? L3

Have you ever seen another person killed or dead, or badly hurt? L4

How about learning that one of these things happened to someone you are close to? L5

IF UNKNOWN: **Have you ever been the victim of a serious crime?** L6

IF NO EVENTS ENDORSED: **What would you say has been the most stressful or traumatic experience you have had over your life?** L7

IF NO EVENTS ACKNOWLEDGED, CHECK HERE ___ AND GO TO ****ADJUSTMENT DISORDER**** *L.20. OTHERWISE CONTINUE ON NEXT PAGE.* L8

Did any of these happen in the past month, since (1 MONTH AGO)**?**

IF YES: *ASSESS THE TRAUMATIC EVENT IN PAST MONTH USING THE QUESTIONS BELOW.*

IF NO: CONTINUE ON TOP OF PAGE L.3.

DETAILS FOR EVENT IN PAST MONTH

IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT)**? Were you concerned about your own safety?**

IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

IF UNKNOWN: **How old were you at the time?**

IF UNKNOWN: **Did this happen more than once?**

Description of traumatic event: L9

_____

_____

*Indicate **type of traumatic event**:* (check all that apply)

___ Death, actual L10

___ Death, threatened L11

___ Serious Injury, actual L12

___ Serious injury, threatened L13

___ Sexual violence, actual L14

___ Sexual violence, threatened L15

*Indicate **mode of exposure** to traumatic event:* (check all that apply)

___ Directly experienced L16

___ Witnessed happening to others in person L17

___ Learning about actual or threatened violence or accidental death of a close family member or friend L18

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L19

Age at time of event: ____ L20

*Indicate **type of exposure**:* (circle the appropriate number)

1 – Single event L21

2 – Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years

→ *IF NO EVENTS PRIOR TO PAST MONTH, GO TO* ***ACUTE STRESS DISORDER*** *L.6.*

→ *IF EVENTS PRIOR TO PAST MONTH, REVIEW THE TYPES OF TRAUMA INDICATED ON SCREENING (PAGE L.1 IN THE STANDARD VERSION OF MODULE L OR PAGES ALT-L.1 THROUGH ALT-L3 IN THE ALTERNATE VERSION) AND CHOOSE THE THREE MOST SEVERE EVENTS TO ASSESS, USING THE FOLLOWING QUESTIONS:*

DETAILS FOR PAST EVENT #1

Description of traumatic event**:** L22

→ IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

_____
_____

→ IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT)**? Were you concerned about your own safety?**

→ IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

Indicate ***type of traumatic event****:* (check all that apply)

___ Death, actual L23

___ Death, threatened L24

___ Serious Injury, actual L25

___ Serious injury, threatened L26

___ Sexual violence, actual L27

___ Sexual violence, threatened L28

Indicate ***mode of exposure*** *to traumatic event:* (check all that apply)

___ Directly experienced L29

___ Witnessed happening to others in person L30

___ Learning about actual or threatened violence or accidental death of a close family member or friend L31

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L32

IF UNKNOWN: **How old were you at the time?**

Age at time of event: ____ L33

IF UNKNOWN: **Did this happen more than once?**

Indicate ***type of exposure****:* (circle the appropriate number) L34

1 – Single event

2 – Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years)

DETAILS FOR PAST EVENT #2

IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT**)? Were you concerned about your own safety?**

IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

Description of traumatic event**:**

L35

_____
_____

*Indicate **type of traumatic event**:* (check all that apply):

___ Death, actual L36

___ Death, threatened L37

___ Serious Injury, actual L38

___ Serious injury, threatened L39

___ Sexual violence, actual L40

___ Sexual violence, threatened L41

*Indicate **mode of exposure** to traumatic event*: (check all that apply)

___ Directly experienced L42

___ Witnessed happening to others in person L43

___ Learning about actual or threatened violence or accidental death of a close family member or friend L44

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L45

IF UNKNOWN: **How old were you at the time?**

Age at time of event: ____ L46

IF UNKNOWN: **Did this happen more than once?**

*Indicate **type of exposure**:* (circle the appropriate number)

L47

1 − Single event

2 − Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years

DETAILS FOR PAST EVENT #3

Description of traumatic event: L48

IF DIRECT EXPOSURE TO TRAUMA:

What happened? Were you afraid of dying or being seriously hurt? Were you seriously hurt?

IF WITNESSED TRAUMATIC EVENT HAPPENING TO OTHERS:

What happened? What did you see? How close were you to (TRAUMATIC EVENT)**? Were you concerned about your own safety?**

IF LEARNED ABOUT TRAUMATIC EVENT:

What happened? Who did it involve? (How close [emotionally] were you to them? Did it involve violence, suicide or a bad accident?)

_____
_____

*Indicate **type of traumatic event**:* (check all that apply)

___ Death, actual L49

___ Death, threatened L50

___ Serious Injury, actual L51

___ Serious injury, threatened L52

___ Sexual violence, actual L53

___ Sexual violence, threatened L54

*Indicate **mode of exposure** to traumatic event:* (check all that apply)

___ Directly experienced L55

___ Witnessed happening to others in person L56

___ Learning about actual or threatened violence or accidental death of a close family member or friend L57

___ Repeated or extreme exposure to aversive details of traumatic events (e.g., police officers repeatedly exposed to details of child abuse) L58

IF UNKNOWN: **How old were you at the time?**

Age at time of event: ____ L59

IF UNKNOWN: **Did this happen more than once?**

*Indicate **type of exposure**:* (circle the appropriate number) L60

1 – Single event

2 – Prolonged or repeated exposure to same trauma (e.g., witnessing repeated episodes of parental domestic violence over years

ACUTE STRESS DISORDER (CURRENT ONLY)

ACUTE STRESS DISORDER CRITERIA (PAST MONTH)

*IF NO EVENTS IN PAST MONTH, CHECK HERE ___ AND GO TO ***POSTTRAUMATIC STRESS DISORDER**** *L.11* L61

REVIEW TRAUMATIC EVENTS OCCURRING IN THE PAST MONTH DESCRIBED IN DETAIL ON PAGE L.2.

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

IF MORE THAN ONE TRAUMATIC EVENT IS REPORTED IN THE PAST MONTH: **Which of these do you think has affected you the most in the past month, since** (1 MONTH AGO)**?**

1. Directly experiencing the traumatic event(s). ? 1 2 3 L62
2. Witnessing, in person, the event(s) as it occurred to others. ? 1 2 3 L63
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental. ? 1 2 3 L64
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse) ? 1 2 3 L65

Note: Criterion A.4 does not apply to exposure through electronic media, television, movies, or pictures, unless the exposure is work-related.

AT LEAST ONE A ITEM CODED "3" 1 3 L66

GO TO ***PTSD*** L.11

Now I'd like to ask a few questions about specific ways that (TRAUMATIC EVENT) **may have affected you.**

B. Presence of NINE (or more) of the following symptoms FROM ANY OF THE FIVE CATEGORIES (intrusion, negative mood, dissociation, avoidance, and arousal), beginning or worsening after the traumatic event(s) occurred:

Since (1 MONTH AGO)**...**

...have you had memories of (TRAUMATIC EVENT)**, including feelings, physical sensations, sounds, smells, or images, when you didn't expect to or want to? (How often has this happened?)**

1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). ? 1 2 3 L67

...what about having upsetting dreams that remind you of (TRAUMATIC EVENT)**? Tell me about that.**

2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event. ? 1 2 3 L68

Since (1 MONTH AGO)**...** **...what about finding yourself acting or feeling as if you were back in the situation? (Have you had "flashbacks" of** [TRAUMATIC EVENT]**?)**	3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)	?	1	2	3	L69
...have you had a strong emotional or physical reaction when something reminded you of (TRAUMATIC EVENT)**? Give me some examples of the kinds of things that would trigger this reaction. (Things like...seeing a person who resembles the person who attacked you, hearing the screech of brakes if you were in a car accident, hearing the sound of helicopters if you were in combat, any kind of physically intimacy in someone who was raped?)** *IF YES:* **What kind of reaction did you have? Did you get very upset or stay upset for a while, even after the reminder had gone away? (What about having physical symptoms--like breaking out in a sweat, breathing heavily or irregularly, or feeling your heart pound or race when something reminded you of** [TRAUMATIC EVENT]**? How about feeling tense or shaky?)**	4. Intense or prolonged psychological distress or marked physiological reactions in response to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).	?	1	2	3	L70
...have you been unable to experience good feelings, like feeling happy, joyful, satisfied, loving, or tender towards other people? *IF YES:* **Is this different from the way you were before** (TRAUMATIC EVENT)**?**	5. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).	?	1	2	3	L71
...have you had the feeling that you were in a daze, that everything was unreal or that you were in a dream, that you were detached from your own body or mind, that time was moving more slowly, or that you were an outside observer of your own thoughts or movements?	6. An altered sense of reality of one's surroundings or one's self (e.g., seeing oneself from another's perspective, being in a daze, time slowing).	?	1	2	3	L72
...have you been unable to remember some important part of what happened? *IF YES:* **Did you get a head injury during** (TRAUMATIC EVENT)**? Were you drinking a lot or were you taking any drugs at the time of** (TRAUMATIC EVENT)**?**	7. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).	?	1	2	3	L73
...have you done things to avoid remembering or thinking about (TRAUMATIC EVENT) **like keeping yourself busy, distracting yourself like by playing computer or video games or watching TV, or using drugs or alcohol to "numb" yourself or to try to forget what happened?** *IF NO:* **How about doing things to avoid having feelings similar to those you had during** (TRAUMATIC EVENT)**?**	8. Efforts to avoid distressing memories, thoughts, or feelings about or closely related with traumatic event(s).	?	1	2	3	L74

Since (1 MONTH AGO)**...**

...have there been things, places, or people that you have tried to avoid because it brought up upsetting memories, thoughts, or feelings about (TRAUMATIC EVENT)**?**

IF NO: **How about avoiding certain activities, situations, or topics of conversation?**

9. Efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s). ? 1 2 3 L75

...how have you been sleeping since (TRAUMATIC EVENT)**? (Is this a change from before** [TRAUMATIC EVENT]**?)**

10. Sleep disturbances (e.g., difficulty falling or staying asleep or restless sleep). ? 1 2 3 L76

...have you lost control of your anger, so that you threatened or hurt someone or damaged something? Tell me what happened. (Was it over something little or even nothing at all?)

IF NO: **Since** (TRAUMATIC EVENT)**, have you been more quick-tempered or had a shorter "fuse" than before?**

IF YES TO EITHER: **How different is this from the way you were before** (TRAUMATIC EVENT)**?**

11. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects. ? 1 2 3 L77

...have you noticed that you have been more watchful or on guard since (TRAUMATIC EVENT)**? (What are some examples?)**

IF NO: **Have you been extra aware of your surroundings and your environment?**

12. Hypervigilance. ? 1 2 3 L78

...have you had trouble concentrating? (What are some examples? Is this a change from before [TRAUMATIC EVENT]**?)**

13. Problems with concentration. ? 1 2 3 L79

...have you been jumpy or easily startled, like by sudden noises? (Is this a change from before [TRAUMATIC EVENT]**?)**

14. Exaggerated startle response. ? 1 2 3 L80

AT LEAST NINE "B" SXS ARE CODED "3." 1 3 L81

GO TO ***PTSD*** L.11

About how long did ("B" SXS CODED "3") **last altogether?**

C. Duration of the disturbance (symptoms in Criterion B) is 3 days to 1 month after trauma exposure. ? 1 2 3 L82

GO TO ***PTSD*** L.11

IF UNKNOWN: **What effect have** (ASD SXS) **had on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION D:

How have (ASD SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (ASD SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have they affected your ability to take care of things at home? What about being involved in things that are important to you, like religious activities, physical exercise, or hobbies?

Have (ASD SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by** (ASD SXS)**?**

D. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3 L83

GO TO ***PTSD*** L.11

Did (TRAUMATIC EVENT) **cause any injury to your head or brain?**

Have you been drinking a lot or using a lot of drugs since (TRAUMATIC EVENT)**? Tell me about that. (How much have you been [drinking/using (**DRUG[S]**)? (Do you think your problems since** [TRAUMATIC EVENT] **are more due to your [drinking/**(DRUG) **use] rather than to your reaction to** [TRAUMATIC EVENT] **itself?)**

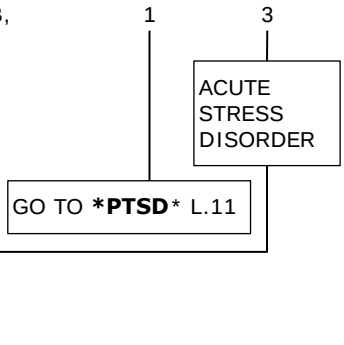
IF PSYCHOTIC: **Have you had** (ASD SXS) **only when you were** (PSYCHOTIC SXS)**?**

E. The disturbance is not attributable to the physiological effects of a substance (e.g., medication or alcohol) or another medical condition (e.g., mild traumatic brain injury) and is not better explained by Brief Psychotic Disorder.

1 3 L84

GO TO ***PTSD*** L.11

ACUTE STRESS DISORDER CRITERIA A, B, C, D, AND E ARE CODED "3."



L85

Specify if:

L86

IF UNKNOWN: H**ave you had any panic attacks in the past month?**

___ **With panic attacks**: if one or more panic attacks in the past month occurring in the context of current Acute Stress Disorder (see page F.7) and criteria have never been met for Panic Disorder.

POSTTRAUMATIC STRESS DISORDER

POSTTRAUMATIC STRESS DISORDER CRITERIA

FOR FOLLOWING QUESTIONS, FOCUS ON THE THREE MOST SEVERE TRAUMATIC EVENT(S) DESCRIBED ON PAGES L.3–L.5.

*IF ALL TRAUMAS ARE CONFINED TO THE PAST MONTH, CHECK HERE __ AND SKIP TO ***ADJUSTMENT DISORDER*** PAGE L.20.* L87

.

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

IF MORE THAN ONE TRAUMATIC EVENT IS REPORTED: **Which of these do you think affected you the most?**

IF SELECTED EVENT IS ULTIMATELY NOT ASSOCIATED WITH THE FULL PTSD SYNDROME, CONSIDER RE-ASSESSING THE ENTIRE PTSD CRITERIA SET (PAGES L.11–L.17) FOR OTHER REPORTED TRAUMAS.

1. Directly experiencing the traumatic event(s). ? 1 2 3 L88

2. Witnessing, in person, the event(s) as it occurred to others. ? 1 2 3 L89

3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental. ? 1 2 3 L90

4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). ? 1 2 3 L91

Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless the exposure is work-related.

AT LEAST ONE A ITEM CODED "3" 1 3 L92

→ GO TO *ADJUSTMENT DISORDER* L.20

Now I'd like to ask a few questions about specific ways that (TRAUMATIC EVENT) **may have affected you at any time since** (TRAUMATIC EVENT).

B. Presence of one (or more) of the following intrusion symptoms associated with the traumatic events), beginning after the traumatic event(s) occurred:

For example, since (TRAUMATIC EVENT)**....**

1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). ? 1 2 3 L93

...have you had memories of (TRAUMATIC EVENT)**, including feelings, physical sensations, sounds, smells, or images, when you didn't expect to or want to? (How often has this happened?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

→ Past month ? 1 2 3 L94

...what about having upsetting dreams that reminded you of (TRAUMATIC EVENT)**? Tell me about that.**

2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event. ? 1 2 3 L95

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

→ Past month ? 1 2 3 L96

Since (TRAUMATIC EVENT)**...**

...what about having found yourself acting or feeling as if you were back in the situation? (Have you had "flashbacks' of [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)

? 1 2 3 L97

Past month
? 1 2 3 L98

...have you had a strong emotional or physical reaction when something reminded you of (TRAUMATIC EVENT)**? Give me some examples of the kinds of things that would have triggered this reaction. (Things like...seeing a person who resembles the person who attacked you, hearing the screech of brakes if you were in a car accident, hearing the sound of helicopters if you were in combat, any kind of physically intimacy in someone who was raped?)**

NOTE: IF DENIES EMOTIONAL OR PHYSICAL REACTION TO REMINDERS, CODE "1" FOR BOTH B.4 (EMOTIONAL REACTION) AND B.5 (PHYSICAL REACTION).

IF YES: **What kind of reaction did you have? Did you get very upset or stay upset for a while, even after the reminder had gone away?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

? 1 2 3 L99

Past month
? 1 2 3 L100

IF ACKNOWLEDGES STRONG EMOTIONAL OR PHYSICAL REACTION: **What about having physical symptoms—like breaking out in a sweat, breathing heavily or irregularly, or feeling your heart pound or race when something reminded you of** (TRAUMATIC EVENT)**? How about feeling tense or shaky?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

? 1 2 3 L101

Past month
? 1 2 3 L102

AT LEAST ONE "B" SX IS CODED "3." 1 3 L103

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION B MET PAST MONTH: 1 3 L104

Since (TRAUMATIC EVENT)**...**

C. Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:

...have you done things to avoid remembering or thinking about (TRAUMATIC EVENT) **like keeping yourself busy, distracting yourself like by playing computer or video games or watching TV, or using drugs or alcohol to "numb" yourself or try to forget what happened? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF NO: **How about doing things to avoid having feelings similar to those you had during** (TRAUMATIC EVENT)**? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

1. Avoidance of, or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

? 1 2 3 L105

Past month
? 1 2 3 L106

...have there been things, places, or people that you have tried to avoid because it brought up upsetting memories, thoughts, or feelings about (TRAUMATIC EVENT)**? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF NO: **How about avoiding certain activities, situations, or topics of conversation? (Since** [TRAUMATIC EVENT]**, how long has this gone on?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations), that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

? 1 2 3 L107

Past month
? 1 2 3 L108

AT LEAST ONE "C" SX IS CODED "3."

1 3 L109

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION C MET PAST MONTH: L110
1 3

Since (TRAUMATIC EVENT)**...**

D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following**:**

...have you been unable to remember some important part of what happened? (Tell me about that.)

IF YES: **Did you get a head injury during** (TRAUMATIC EVENT)**? Were you drinking a lot or were taking any drugs at the time of** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How many times?**

1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).

? 1 2 3 L111

Past month ? 1 2 3 L112

...has there been a change in how you think about yourself? (Like feeling you are "bad," or permanently damaged or "broken?" Tell me about that. Since this started, have you felt this way most of the time?)

IF NO: **Has there been a change in how you see other people or the way the world works? (Like you can't trust anyone anymore? Like the world is a completely dangerous place? Tell me about that. Since this started, have you felt this way most of the time?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How much of the time?**

2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad," "No one can be trusted," "The world is completely dangerous," "My whole nervous system is permanently ruined").

? 1 2 3 L113

Past month ? 1 2 3 L114

...have you blamed yourself for the (TRAUMATIC EVENT) **or how it affected your life? (Like feeling that** (TRAUMATIC EVENT) **was your fault or that you should have done something to prevent it? Like feeling that you should have gotten over it by now?)**

→ *IF YES:* **Tell me about that. (Since this started, have you felt this way most of the time?)**

→ IF NO: **Have you blamed someone else for** (TRAUMATIC EVENT)**? Tell me about that. (What did they have to do with** [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How much of the time?**

3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.

? 1 2 3 L115

Past month ? 1 2 3 L116

...have you had bad feelings much of the time, like feeing sad, angry, afraid, guilty, ashamed, "in shock"? (Tell me about that.)

IF YES: **Is this different from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).

? 1 2 3 L117

Past month ? 1 2 3 L118

Since (TRAUMATIC EVENT**)...**

L119

...have you been less interested in things that you were interested in before (TRAUMATIC EVENT)**, like spending time with family or friends, reading books, watching TV, cooking, or sports? (Tell me about that.)**

IF NO LOSS OF INTEREST: **Are you still doing as many activities as you used to?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How many times?**

5. Markedly diminished interest or participation in significant activities.

? 1 2 3

Past month
? 1 2 3 L120

...have you felt distant or disconnected from others or have you closed yourself off from other people? (Tell me about that.)

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)? **How often?**

6. Feelings of detachment or estrangement from others.

? 1 2 3 L121

Past month
? 1 2 3 L122

...have you been unable to experience good feelings, like feeling happy, joyful, satisfied, loving, or tender towards other people? (Tell me about that.)

IF YES: **Is this different from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

? 1 2 3 L123

Past month
? 1 2 3 L124

AT LEAST THREE "D" SXS ARE CODED "3."

1 3 L125

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION D MET PAST MONTH:
1 3 L126

Since (TRAUMATIC EVENT)**...**

E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

...have you lost control of your anger, so that you threatened or hurt someone or damaged something? Tell me what happened. (Was it over something little or even nothing at all?)

IF NO: **Since** (TRAUMATIC EVENT)**, have you been more quick-tempered or had a shorter "fuse" than before?**

IF YES TO EITHER: **How different is this from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How often?**

1. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.

? 1 2 3 L127

Past month
? 1 2 3 L128

Since (TRAUMATIC EVENT**)...**

...have you done reckless things, like driving dangerously, or drinking or using drugs without caring about the consequences?

IF NO: **How about hurting yourself on purpose or trying to kill yourself? (What did you do?)**

IF YES TO EITHER: **How different is this from the way you were before** (TRAUMATIC EVENT)**?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

2. Reckless or self-destructive behavior.

NOTE: Any current suicidal thoughts, plans, or actions should be thoroughly assessed by the clinician and action taken if necessary.

? 1 2 3 L129

Past month
? 1 2 3 L130

...have you noticed that you have been more watchful or on guard? (What are some examples?)

IF NO: **Have you been extra aware of your surroundings and your environment?**

IF LIFETIME RATING OF "3": **Has this also happened in the past month, since** (1 MONTH AGO)**? How often?**

3. Hypervigilance.

? 1 2 3 L131

Past month
? 1 2 3 L132

...have you been jumpy or easily startled, like by sudden noises? (Is this a change from before [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

4. Exaggerated startle response.

? 1 2 3 L133

Past month
? 1 2 3 L134

...have you had trouble concentrating? (What are some examples? (Is this a change from before [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

5. Problems with concentration.

? 1 2 3 L135

Past month
? 1 2 3 L136

...how have you been sleeping since (TRAUMATIC EVENT)**? (Is this a change from before** [TRAUMATIC EVENT]**?)**

IF LIFETIME RATING OF "3": **Has this also happened in the past month? How often?**

6. Sleep disturbances (e.g., difficulty falling or staying asleep or restless sleep).

? 1 2 3 L137

Past month
? 1 2 3 L138

AT LEAST TWO "E" SXS ARE CODED "3." 1 3 L139

GO TO ***ADJUSTMENT DISORDER*** L.20

CRITERION E MET PAST MONTH
1 3 L140

About how long did these (PTSD SYMPTOMS CODED "3") **last altogether?**

F. Duration of the disturbance (symptoms in criteria B, C, D, and E) is more than 1 month. ? 1 2 3 L141

GO TO ***ADJUSTMENT DISORDER*** L.20

IF UNKNOWN: **What effect did** (PTSD SXS) **have on your life?**

G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. ? 1 2 3 L142

GO TO ***ADJUSTMENT DISORDER*** L.20

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION G:

CRITERION H HAS BEEN OMITTED.

How have (PTSD SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (PTSD SXS) **affected your work/school? (How about your attendance at work or school? Have they affected the quality of your work/schoolwork?)**

How have they affected your ability to take care of things at home? What about being involved in things that are important to you like religious activities, physical exercise, or hobbies?

Have (PTSD SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by** (PTSD SXS)**?**

IF LIFETIME RATING OF "3": **How have** (PTSD SXS) **affected your life in the past month, since** (1 MONTH AGO)**?**

CRITERION G MET PAST MONTH ? 1 2 3 L143

POSTTRAUMATIC STRESS DISORDER CRITERIA A, B, C, D, E, F, AND G ARE CODED "3." 1 3 L144

GO TO ***ADJUSTMENT DISORDER*** L.20

POST-TRAUMATIC STRESS DISORDER

PTSD CRITERIA B, C, D, E, AND G MET FOR THE PAST MONTH. ? 1 3 L145

POST-TRAUMATIC STRESS DISORDER

CURRENT POST-TRAUMATIC STRESS DISORDER

When did you last have (ANY SXS OF PTSD)?

Number of months prior to interview when last had a symptom of PTSD _____ ___ _____ L146

IF UNKNOWN: **How old were you when you first started having** (SXS OF PTSD)**?**

Age at onset of Posttraumatic Stress Disorder (CODE 99 IF UNKNOWN). _____ _____ L147

IF POSTTRAUMATIC STRESS DISORDER IS NOT CURRENT, GO TO ****ADJUSTMENT DISORDER**** *L.20.*

IF UNKNOWN: **Did most of these problems begin soon after** (TRAUMA)**?**

Specify if:

IF NO: **How much time was it from the** (TRAUMA) **and when you had most of these problems? (Was it less than 6 months?)**

_____ **With delayed expression:** If the full diagnostic criteria are not met until at least 6 months after the event (although the onset and expression of some symptoms may be immediate). L148

While you had these problems, did you also often have the feeling that everything was unreal or that you were in a dream, you were detached from your body or mind, that time was moving slowly, or that you were an outside observer of your own thoughts or movements?

IF YES: **Does this occur at times other than when you are using drugs or alcohol? Does this occur at times other than during a seizure?**

*Indicate **type***: (circle the appropriate number)

L149

1 – **With dissociative symptoms**:

The individual's symptoms meet the criteria for Posttraumatic Stress Disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

Depersonalization: Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).

Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).

Note: To use this subtype, the dissociative symptoms must not be attributable to the physiological effects of a substance (e.g., blackouts, behavior during alcohol intoxication) or another medical condition (e.g., complex partial seizures).

2 – **Without dissociative symptoms**: If neither 1 nor 2 above.

Specify if:

IF UNKNOWN: **Have you had any panic attacks in the past month?**

L150

___ With panic attacks: if one or more panic attacks in the past month occurring in the context of current Posttraumatic Stress Disorder (see page F.7) and criteria have never been met for Panic Disorder.

ADJUSTMENT DISORDER (CURRENT ONLY)

*CONSIDER THIS SECTION ONLY IF THERE ARE SYMPTOMS OCCURRING IN THE PAST 6 MONTHS THAT DO NOT MEET THE CRITERIA FOR ANOTHER DSM-5 DISORDER. OTHERWISE, CHECK HERE ___ AND GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER*** L.23. INFORMATION OBTAINED FROM OVERVIEW OF PRESENT ILLNESS WILL USUALLY BE SUFFICIENT TO RATE THE CRITERIA FOR ADJUSTMENT DISORDER.* L151

ADJUSTMENT DISORDER CRITERIA

IF UNKNOWN: **Did anything happen to you before** (SYMPTOMS) **began?**

IF YES: **Tell me about what happened. Do you think that** (STRESSOR) **had anything to do with your developing** (SXS)?

→ *IF SINGLE EVENT*: **How long after** (STRESSOR) **did you first develop** (SXS)**? (Was it within 3 months?)**

→ *IF CHRONIC STRESSOR:* **How long after** (STRESSOR) **began did you first develop** (SXS)? **(Was it within 3 months?)**

A. The development of emotional or behavioral symptoms in response to an identifiable stressor(s) occurring within 3 months of the onset of the stressor(s). L152

DESCRIBE SYMPTOMS:

DESCRIBE STRESSOR:

? 1 2 3

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

IF UNKNOWN: **What effect did** (SXS) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION B:

How have (SXS) **affected your relationships or your interactions with other people? (Have they caused you any problems in your relationships with your family, romantic partner or friends?)**

How have (SXS) **affected your work/school? (How about your attendance at work or school? Did** [SXS] **make it more difficult to do your work/schoolwork? How did** [SXS] **affect the quality of your work/schoolwork?)**

How have they affected your ability to take care of things at home? What about being involved in things that are important to you like religious activities, physical exercise, or hobbies?

Have (SXS) **affected any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much have you been bothered or upset by having** (SXS)**? How upset are you about** (STRESSOR)**? (Are you more upset than most other people would be? Have others said that you're more upset than you should be? Have** [SXS] **lasted longer than you or other people think they should have?)**

B. These symptoms or behaviors are clinically significant as evidenced by one or both of the following: L153

1. Marked distress that is out of proportion to the severity and intensity of the stressor, taking into account the external context and the cultural factors that might influence symptom severity and presentation.

2. Significant impairment in social, occupational, or other important areas of functioning.

? 1 2 3

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

Have you had this kind of reaction many times before?

IF UNKNOWN: **Were you having these** (SXS) **even before** (STRESSOR) **happened?**

C. The stress-related disturbance does not meet the criteria for another mental disorder and is not merely an exacerbation of a preexisting mental [including personality] disorder.

? 1 3 L154

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

IF UNKNOWN: **Did someone close to you die just before** (SXS)**?**

D. The symptoms do not represent normal bereavement.

? 1 3 L155

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

IF UNKNOWN: **How long has it been since** (STRESSOR AND ITS CONSEQUENCES) **was over?**

E. Once the stressor (or its consequences) has terminated, the symptoms do not persist for more than an additional 6 months.

? 1 2 3 L156

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

ADJUSTMENT DISORDER CRITERIA A, B, C, D, AND E ARE CODED "3" DURING THE PAST 6 MONTHS.

1 3 L157

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** L.23

CURRENT ADJUST-MENT DISORDER

*Indicate **type** based on predominant symptoms:* (circle the appropriate number) L158

1 – **With depressed mood:** Low mood, tearfulness, or feelings of hopelessness are predominant.

2 – **With anxiety:** Nervousness, worry, jitteriness, or separation anxiety is predominant.

3 – **With mixed anxiety and depressed mood:** A combination of depression and anxiety is predominant.

4 – **With disturbance of conduct:** Disturbance in conduct is predominant.

5 – **With mixed disturbance of emotions and conduct:** Both emotional symptoms (e.g., depression, anxiety) and a disturbance of conduct are predominant.

6 – **Unspecified:** For maladaptive reactions that are not classifiable as one of the specific subtypes of adjustment disorder (e.g., physical complaints, social withdrawal, or work or academic inhibition).

IF UNKNOWN: **When did** (SXS) **begin?**

Specify if: (circle the appropriate number) L159

1 - **Acute:** if the disturbance lasts less than 6 months.

2 - **Persistent (chronic):** if the disturbance lasts for 6 months or longer.

GO TO ***OTHER SPECIFIED TRAUMA- AND STRESSOR-INDUCED DISORDER*** NEXT PAGE

OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER

OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER

Symptoms characteristic of a Trauma- and Stressor-Related Disorder predominate but do not meet the full criteria for any of the disorders in the Trauma- and Stressor-Related Disorders diagnostic class

1 → END OF SCID

3 L160

IF UNKNOWN: **What effect did** (SXS OF TRAUMA- AND STRESSOR-RELATED TO STRESSOR) **have on your life?**

ASK THE FOLLOWING QUESTIONS AS NEEDED TO RATE CRITERION:

How did (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect your relationships or your interactions with other people? (Did** [SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER] **cause you any problems in your relationships with your family, romantic partner or friends?)**

How did (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect your school/work? (How about your attendance at work or school? Did** [SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER] **make it more difficult to do your work/schoolwork? How did** [SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER] **affect the quality of your work/schoolwork?)**

How did (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect your ability to take care of things at home? How about doing other things that are important to you like religious activities, physical exercise, or hobbies? Did you avoid doing anything because you felt like you weren't up to it?**

Did your (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER) **affect any other important part of your life?**

IF HAVE NOT INTERFERED WITH LIFE: **How much were you bothered or upset by having** (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER)**?**

[Symptoms] that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning

1 → END OF SCID

3 → OTHER SPECIFIED TRAUMA- AND STRESSOR-RELATED DISORDER

L161

IF UNCLEAR: **During the past month, have you had** (SXS OF TRAUMA- AND STRESSOR-RELATED DISORDER)**?**

Check here ___ if present in last month. L162

*Indicate **type** of Other Specified Trauma- and Stressor-related Disorder*: L163
(circle the appropriate number)

1 – Adjustment-like disorders with delayed onset of symptoms that **occur more than 3 months after the stressor**.

2 – Adjustment-like disorders **with prolonged duration of more than 6 months** without prolonged duration of stressor

3 – **Persistent complex bereavement disorder:** This disorder is characterized by severe and persistent grief and mourning reactions

4 – **Other**: _____

END OF SCID

STRUCTURED CLINICAL INTERVIEW FOR DSM-5® DISORDERS

SCID-5-RV (Research Version)

Version 1.0.0

Michael B. First, MD; Janet B.W. Williams, PhD;
Rhonda S. Karg, PhD; and Robert L. Spitzer, MD

Study: _____ Study No.: __ __ __ __ P1

Subject: _____ I.D. No.: __ __ __ __ P2

Rater: _____ Rater No.: __ __ __ P3

Date of Interview: __ __ __ __ __ __ P4
Month. Day Year

Sources of information (check all that apply):

__ Subject/Patient P5
__ Family/friends/associates P6
__ Health professional/chart/referral note P7

Edited and checked by: _____ Date: _____

For citation: First MB, Williams JBW, Karg RS, Spitzer RL: Structured Clinical Interview for DSM-5—Research Version (SCID-5 for DSM-5, Research Version; SCID-5-RV, Version 1.0.0). Arlington, VA, American Psychiatric Association, 2015

Web page: **http://www.scid5.org** E-mail: **scid5@columbia.edu**

SCID Code	Diagnosis	Inadequate Info.	Absent	Sub-threshold	Threshold	Absent	Present	
			Lifetime Prevalence			Meets Symptomatic Dx. Crit. Past Month		
BIPOLAR AND RELATED DISORDERS								
01	Bipolar I Disorder (D.1/lifetime) (D.14/past month)	?	1	2	3 → 1		3	P8 P9
					Current or most recent episode: 1 Manic 2 Hypomanic 3 Depressed 4 Unspecified			P10
02	Bipolar II Disorder (D.3/lifetime) (D.14/past month)	?	1	2	3 → 1		3	P11 P12
					Current or most recent episode: 1 Hypomanic 2 Depressed			P13
			Current Only			Meets Symptomatic Dx. Crit. Past 2 Years		
03	Cyclothymic Disorder (A.29/past 2 years only)	?				1	3	P14
			Lifetime Prevalence			Meets Symptomatic Dx. Crit. Past Month		
04	Other Specified Bipolar Disorder (D.7/lifetime)(D.8/past month)	?	1	2	3 → 1		3	P15 P16
05	Bipolar Disorder Due to Another Medical Condition (A.43/lifetime)(A.43/past month) Specify AMC:_____	?	1		3 → 1		3	P17 P18
06	Substance/Medication-Induced Bipolar Disorder (A.45/lifetime) (A.45/past month) Specify substance:_____	?	1		3 → 1		3	P19 P20
DEPRESSIVE DISORDERS								
07	Major Depressive Disorder (D.9/lifetime)(D.17/past month)	?	1	2	3 → 1		3	P21 P22
			Lifetime Prevalence			Meets Symptomatic Dx. Crit. Past 2 Years		
08	Persistent Depressive Disorder (A.32/past two years)(A.36/prior to past two years)	?	1	2	3 → 1		3	P23 P24
			Current Only			Meets Symptomatic Dx. Crit. Past 12 Months		
09	Premenstrual Dysphoric Disorder (A.41/past 12 months)	?				1	3	P25
			Lifetime Prevalence			Meets Symptomatic Dx. Crit. Past Month		
10	Other Specified Depressive Disorder (D.12/lifetime) (D.13/past month)	?	1		3 → 1		3	P26 P27
11	Depressive Disorder Due to Another Medical Condition (A.48/lifetime)(A.48/past month) Specify AMC:_____	?	1		3 → 1		3	P28 P29

SCID Code	Diagnosis	Inadequate Info.	Absent	Sub-threshold	Threshold	Absent	Present	
12	Substance/Medication-Induced Depressive Disorder (A.51/lifetime)(A.51/past month) Specify substance:___	?	1		3 ---------> 1		3	P30 P31
SCHIZOPHRENIA AND OTHER PSYCHOTIC DISORDERS								
13	Schizophrenia (C.5/lifetime) (C.17/past month)	?	1	2	3 ---------> 1		3	P32 P33
14	Schizophreniform Disorder (C.7/lifetime)(C.19/past month)	?	1	2	3 ---------> 1		3	P34 P35
15	Schizoaffective Disorder (C.9/lifetime)(C.17/past month)	?	1	2	3 ---------> 1		3	P36 P37
16	Delusional Disorder (C.11/lifetime)(C.17/past month)	?	1	2	3 ---------> 1		3	P38 P39
17	Brief Psychotic Disorder (C.14/lifetime)(C.19/past month)	?	1	2	3 ---------> 1		3	P40 P41
18	Psychotic Disorder Due to Another Medical Condition (C.22/lifetime)(C.19/past month) Specify GMC:_____	?	1		3 ---------> 1		3	P42 P43
19	Substance-Induced Psychotic Disorder (C.24/lifetime) (C.19/past month) Specify substance:_____	?	1		3 ---------> 1		3	P44 P45
20	Other Specified Psychotic Disorder(C.16/lifetime) (C.19/past month)	?	1		3 ---------> 1		3	P46 P47
			Lifetime Prevalence			**Meets Symptomatic Dx. Crit. Past 12 Months**		
SUBSTANCE USE DISORDERS								
21	Alcohol (E.4/past 12 months) (E.9/prior to past 12 months)	?	1	2	3 ---------> 1		3	P48 P49
22	Sedative-Hypnotic-Anxiolytic (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P50 P51
23	Cannabis (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P52 P53
24	Stimulants/Cocaine (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P54 P55
25	Opioids (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P56 P57
26	PCP (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P58 P59
27	Other Hallucinogens (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P60 P61
28	Inhalants (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P62 P63
29	Other/Unknown (E.17/past 12 months) (E.26/prior to past 12 months)	?	1	2	3 ---------> 1		3	P64 P65

SCID Code	Diagnosis	Inadequate Info.	Absent	Sub-threshold	Threshold	Absent	Present	
			Lifetime Prevalence			Meets Symptomatic Dx. Crit. Past Month		
ANXIETY DISORDERS								
30	Panic Disorder (F.5/lifetime)(F.5/past month)	?	1	2	3 ---------> 1		3	P66 P67
			Lifetime Prevalence			Meets Symptomatic Dx. Crit. Past 6 Months		
31	Agoraphobia (F.11/lifetime) (F.12/past 6 months)	?	1	2	3 ---------> 1		3	P68 P69
32	Social Anxiety Disorder (F.16/lifetime)(F.17/past 6 months)	?	1	2	3 ---------> 1		3	P70 P71
33	Specific Phobia (F.21/lifetime) (F.22/past 6 months)	?	1	2	3 ---------> 1		3	P72 P73
34	Generalized Anxiety Disorder (F.30/lifetime)(F.26/past 6 months)	?	1	2	3 ---------> 1		3	P74 P75
			Current Only			Meets Symptomatic Dx. Crit. Past 6 Months		
35	Separation Anxiety Disorder (OPTIONAL) (Opt-F.4/past 6 months only)	?	1			1	3	P76
			Lifetime Prevalence			Meets Symptomatic Dx. Crit. Past Month		
36	Other Specified Anxiety Disorder (F.32/lifetime) (F.32/past month)	?	1		3 ---------> 1		3	P77 P78
37	Anxiety Disorder Due to Another Medical Condition (F.34/lifetime)(F.34/past month) Specify AMC:_____	?	1		3 ---------> 1		3	P79 P80
38	Substance/Medication-Induced Anxiety Disorder (F.36/lifetime)(F.36/past month) Specify substance:_____	?	1		3 ---------> 1		3	P81 P82
OBSESSIVE-COMPULSIVE AND RELATED DISORDERS								
39	Obsessive Compulsive Disorder (G.5/lifetime)(G.6/past month)	?	1	2	3 ---------> 1		3	P83 P84
40	Hoarding Disorder (OPTIONAL) (Opt-G.3/lifetime)(Opt-G.4/past month)	?	1	2	3 ---------> 1		3	P85 P86
41	Body Dysmorphic Disorder (OPTIONAL) (Opt-G.7/lifetime) Opt-G.9/past month)	?	1	2	3 ---------> 1		3	P87 P88
42	Trichotillomania (Hair-Pulling Disorder) (OPTIONAL) (Opt-G.11/lifetime) (Opt-G.12/past month)	?	1	2	3 ---------> 1		3	P89 P90
43	Excoriation (Skin-Picking) Disorder (OPTIONAL) (Opt-G.14/lifetime) (Opt-G.15/past month)	?	1	2	3 ---------> 1		3	P91 P92

SCID Code	Diagnosis	Inadequate Info.	Absent	Sub-threshold	Threshold	Absent	Present	
44	Other Specified Obsessive Compulsive and Related Disorder (G.9/lifetime)(G.9/past month)	?	1	2	3 ---------> 1		3	P93 P94
45	Obsessive-Compulsive and Related Disorder Due to Another Medical Condition (G.13/lifetime)(G.13/past month) Specify AMC: _____	?	1	2	3 ---------> 1		3	P95 P96
46	Substance/Medication-Induced Obsessive-Compulsive and Related Disorder (G.16/lifetime) (G.16/past month). Specify substance: _____	?	1	2	3 ---------> 1		3	P97 P98
				Current Only		**Meets Symptomatic Dx. Crit. Past 3 Months**		
SLEEP-WAKE DISORDERS								
47	Insomnia Disorder (OPTIONAL) (Opt-H.3/past 3 months)	?				1	3	P99
48	Hypersomnolence Disorder (OPTIONAL) (Opt-H.7/past 3 months)	?				1	3	P100
49	Substance-Induced Sleep Disorder (OPTIONAL) (Opt-H.11) Specify substance:_____	?				1	3	P101
				Lifetime Prevalence		**Meets Symptomatic Dx. Crit. Past 3 Months**		
FEEDING AND EATING DISORDERS								
50	Anorexia Nervosa (I.1/lifetime) (I.2/past 3 months)	?	1	2	3 ---------> 1		3	P102 P103
51	Bulimia Nervosa (I.5/lifetime) (I.6/past 3 months))	?	1	2	3 ---------> 1		3	P104 P105
52	Binge Eating Disorder (I.8/lifetime)(I.9/past 3 months)	?	1	2	3 ---------> 1		3	P106 P107
				Current Only		**Meets Symptomatic Dx. Crit. Past Month**		
53	Avoidant/Restrictive Food Intake Disorder (OPTIONAL) (Opt-I.3/past month)	?				1	3	P108
				Lifetime Prevalence		**Meets Symptomatic Dx. Crit. Past Month**		
54	Other Specified Feeding or Eating Disorder (I.10/lifetime) (I.10/past month)	?	1	2	3 ---------> 1		3	P109 P110

SCID Code	Diagnosis	Inadequate Info.	Absent	Sub-threshold	Threshold	Absent	Present	
				Current Only		Meets Symptomatic Dx. Crit. Past 6 Months		
SOMATIC SYMPTOM AND RELATED DISORDERS								
55	Somatic Symptom Disorder (OPTIONAL) (Opt-J.2/past 6 months)	?				1	3	P111
56	Illness Anxiety Disorder (OPTIONAL) (Opt-J.4/past 6 months)	?				1	3	P112
EXTERNALIZING DISORDERS								
57	Adult Attention-deficit/ Hyperactivity Disorder (K.5/past 6 months)	?				1	3	P113
				Current Only		Meets Symptomatic Dx. Crit. Past 12 Months		
58	Intermittent Explosive Disorder (OPTIONAL) (Opt-K.4/past 12 months)	?				1	3	P114
59	Gambling Disorder (OPTIONAL) (Opt-K.7/past 12 months)	?				1	3	P115
				Current Only		Meets Symptomatic Dx. Crit. Past Month		
TRAUMA- AND STRESSOR-RELATED DISORDERS								
60	Acute Stress Disorder (L.10/past month)	?				1	3	P116
				Lifetime Prevalence		Meets Symptomatic Dx. Crit. Past Month		
61	Posttraumatic Stress Disorder (L.18/lifetime)(L.18/past month)	?	1	2	[3] ---------> 1		3	P117 P118
				Current Only		Meets Symptomatic Dx. Crit. Past 6 Months		
62	Adjustment Disorder (L.22/past 6 months)	?				1	3	P119
				Lifetime Prevalence		Meets Symptomatic Dx. Crit. Past Month		
63	Other Specified Trauma- and Stressor-Related Disorder (L.23/lifetime)(L.23/past month)	?	1	2	[3] ---------> 1		3	P120 P121
64	**OTHER DSM-5 DISORDER:** Specify: _____	?	1	2	[3] ---------> 1		3	P122 P123

PRINCIPAL DIAGNOSIS (i.e., the disorder that is [or should be] the main focus of current clinical attention).

Enter SCID Code number from scoresheet for principal diagnosis: __ __ P124

Note: Code 00 if no current mental disorder. Code 99 if unknown.

INTERVIEWER'S DIAGNOSES, IF DIFFERENT FROM SCID DIAGNOSES:

_____ _____ _____ P125

PROVISIONAL DIAGNOSIS (i.e., the disorder(s) that need more information in order to be ruled out). P126

_____

SOCIAL AND OCCUPATIONAL FUNCTIONING ASSESSMENT SCALE (SOFAS)

Consider psychological, social, and occupational functioning on a continuum from excellent functioning to grossly impaired functioning. Include impairments in functioning due to physical limitations, as well as those due to mental impairments. To be counted, impairment must be a direct consequence of mental and physical health problems; the effects of lack of opportunity and other environmental limitations are not be to considered.

CODE (Note: Use intermediate codes when appropriate, e.g., 45, 68, 72). __ __ __ P127

100 Superior functioning in a wide range of activities.

91

90 Good functioning in all areas, occupationally and socially effective.

81

80 No more than a slight impairment in social, occupational, or school functioning (e.g., infrequent interpersonal conflict, temporarily falling behind in schoolwork).

71

70 Some difficulty in social, occupational, or school functioning, but generally functioning well, has some meaningful interpersonal relationships.

61

60 Moderate difficulty in social, occupational, or school functioning (e.g., few friends, conflicts with peers or coworkers).

51

50 Serious impairment in social, occupational, or school functioning (e.g., no friends, unable to keep a job).

41

40 Major impairment in several areas, such as work or school, family relations, (e.g., depressed man avoids friends, neglects family, and is unable to work; child frequently beats up younger children, is defiant at home, and is failing at school).

31

30 Inability to function in almost all areas (e.g., stays in bed all day; no job, home, or friends).

21

20 Occasionally fails to maintain minimal personal hygiene; unable to function independently.

11

10 Persistent inability to maintain minimal personal hygiene. Unable to function without harming self or others or without considerable external support (e.g., nursing care and supervision).

1

0 Inadequate information.

State-Trait Anxiety Inventory for Adults™

Instrument and Scoring Key

Developed by Charles D. Spielberger
in collaboration with R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs

Published by Mind Garden, Inc.

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www.mindgarden.com

SELF-EVALUATION QUESTIONNAIRE STAI Form Y-1

Please provide the following information:

Subject ID_____ Date_____ S_____

Age_____ Gender (*Circle*) **M** **F** T_____

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Subject ID_____Date_____

DIRECTIONS

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	1	2	3	4
22. I feel nervous and restless	1	2	3	4
23. I feel satisfied with myself	1	2	3	4
24. I wish I could be as happy as others seem to be	1	2	3	4
25. I feel like a failure	1	2	3	4
26. I feel rested	1	2	3	4
27. I am "calm, cool, and collected"	1	2	3	4
28. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29. I worry too much over something that really doesn't matter	1	2	3	4
30. I am happy	1	2	3	4
31. I have disturbing thoughts	1	2	3	4
32. I lack self-confidence	1	2	3	4
33. I feel secure	1	2	3	4
34. I make decisions easily	1	2	3	4
35. I feel inadequate	1	2	3	4
36. I am content	1	2	3	4
37. Some unimportant thought runs through my mind and bothers me	1	2	3	4
38. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39. I am a steady person	1	2	3	4
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

State-Trait Anxiety Inventory for Adults™

Scoring Key

Developed by Charles D. Spielberger
in collaboration with R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs

Published by Mind Garden, Inc.

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www.mindgarden.com

State-Trait Anxiety Inventory for Adults Scoring Key (Form Y-1, Y-2)

Developed by Charles D. Spielberger in collaboration with R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs

To use this stencil, fold this sheet in half and line up with the appropriate test side, either Form Y-1 or Form Y-2. Simply total the scoring **weights** shown on the stencil for each response category. For example, for question # 1, if the respondent marked 3, then the **weight** would be **2**. Refer to the manual for appropriate normative data.

Form Y-1	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1.	**4**	**3**	**2**	**1**
2.	**4**	**3**	**2**	**1**
3.	**1**	**2**	**3**	**4**
4.	**1**	**2**	**3**	**4**
5.	**4**	**3**	**2**	**1**
6.	**1**	**2**	**3**	**4**
7.	**1**	**2**	**3**	**4**
8.	**4**	**3**	**2**	**1**
9.	**1**	**2**	**3**	**4**
10.	**4**	**3**	**2**	**1**
11.	**4**	**3**	**2**	**1**
12.	**1**	**2**	**3**	**4**
13.	**1**	**2**	**3**	**4**
14.	**1**	**2**	**3**	**4**
15.	**4**	**3**	**2**	**1**
16.	**4**	**3**	**2**	**1**
17.	**1**	**2**	**3**	**4**
18.	**1**	**2**	**3**	**4**
19.	**4**	**3**	**2**	**1**
20.	**4**	**3**	**2**	**1**

Form Y-2	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21.	**4**	**3**	**2**	**1**
22.	**1**	**2**	**3**	**4**
23.	**4**	**3**	**2**	**1**
24.	**1**	**2**	**3**	**4**
25.	**1**	**2**	**3**	**4**
26.	**4**	**3**	**2**	**1**
27.	**4**	**3**	**2**	**1**
28.	**1**	**2**	**3**	**4**
29.	**1**	**2**	**3**	**4**
30.	**4**	**3**	**2**	**1**
31.	**1**	**2**	**3**	**4**
32.	**1**	**2**	**3**	**4**
33.	**4**	**3**	**2**	**1**
34.	**4**	**3**	**2**	**1**
35.	**1**	**2**	**3**	**4**
36.	**4**	**3**	**2**	**1**
37.	**1**	**2**	**3**	**4**
38.	**1**	**2**	**3**	**4**
39.	**4**	**3**	**2**	**1**
40.	**1**	**2**	**3**	**4**

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Authors: ***Charles D. Spielberger, in collaboration with R.L. Gorsuch, G.A. Jacobs, R. Lushene, and P.R. Vagg***

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Sincerely,

Robert Most
Mind Garden, Inc.
www.mindgarden.com

Subject Number_____ Date_____

Stanford Sleepiness Scale

Please put an **X** next to the statement that best describes how you feel:

Right now I am:

- ☐ Feeling active, vital, alert or wide awake
- ☐ Functioning at high levels, but not at peak; able to concentrate
- ☐ Awake, but relaxed; responsive but not fully alert
- ☐ Somewhat foggy, let down
- ☐ Foggy; losing interest in remaining awake; slowed down
- ☐ Sleepy, woozy, fighting sleep; prefer to lie down
- ☐ No longer fighting sleep, sleep onset soon; having dream-like thoughts
- ❖ Asleep

Satisfaction with Life Scale

Below are five statements with which you may agree or disagree.
Indicate your agreement with each item by placing the appropriate number on the line preceding that item.

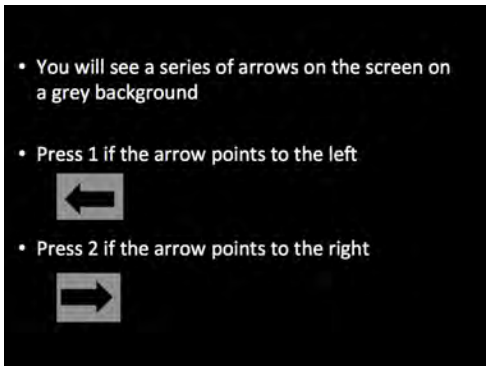
Please be open and honest in your responding.

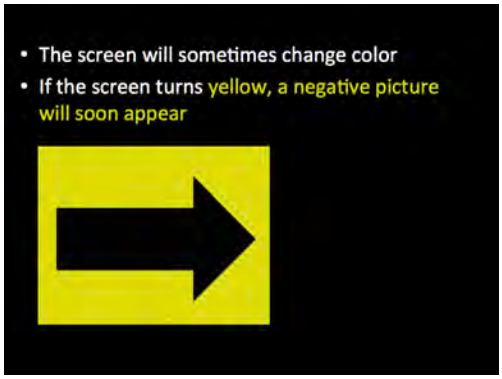
The 7-point scale is as follows:

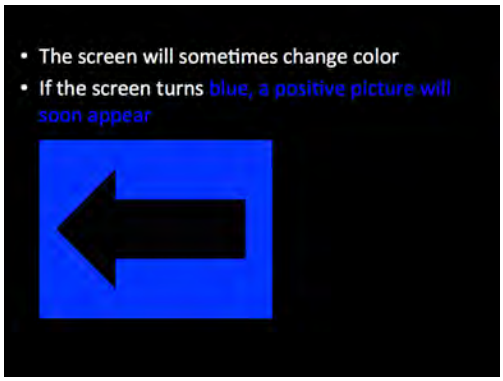
1 = strongly disagree
2 = disagree
3 = slightly disagree
4 = neither agree nor disagree
5 = slightly agree
6 = agree
7 = strongly agree

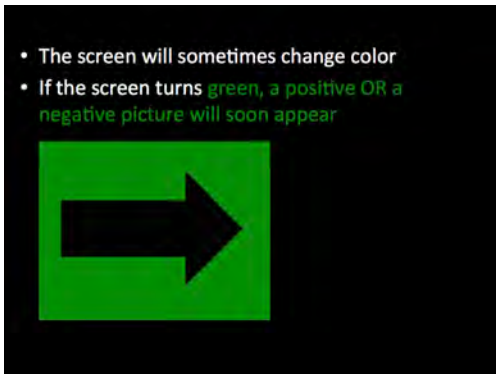
__ 1. In most ways my life is close to my ideal.
__ 2. The conditions of my life are excellent.
__ 3. I am satisfied with my life.
__ 4. So far I have gotten the important things I want in life.
__ 5. If I could live my life over, I would change almost nothing.

The Anticipation Task









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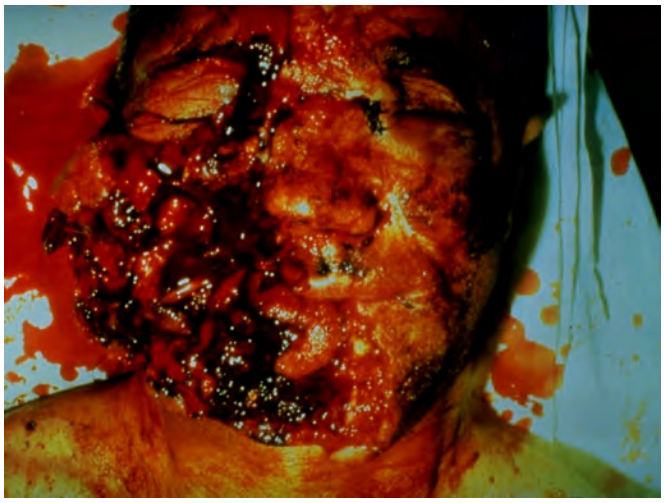
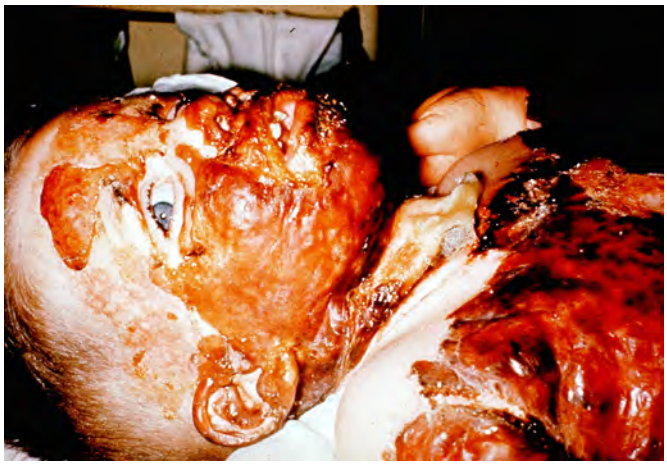
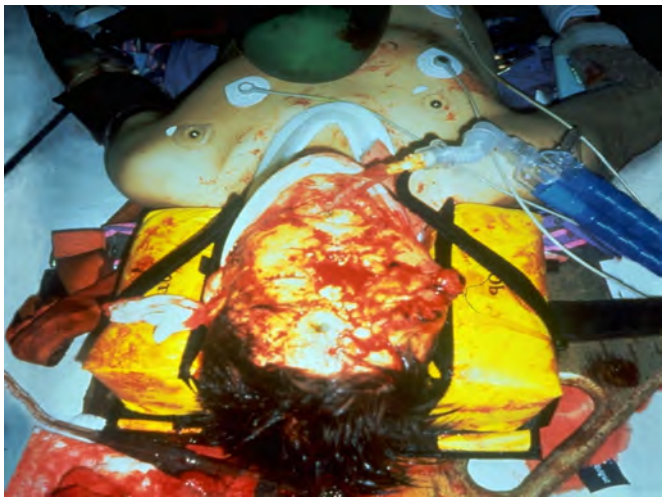
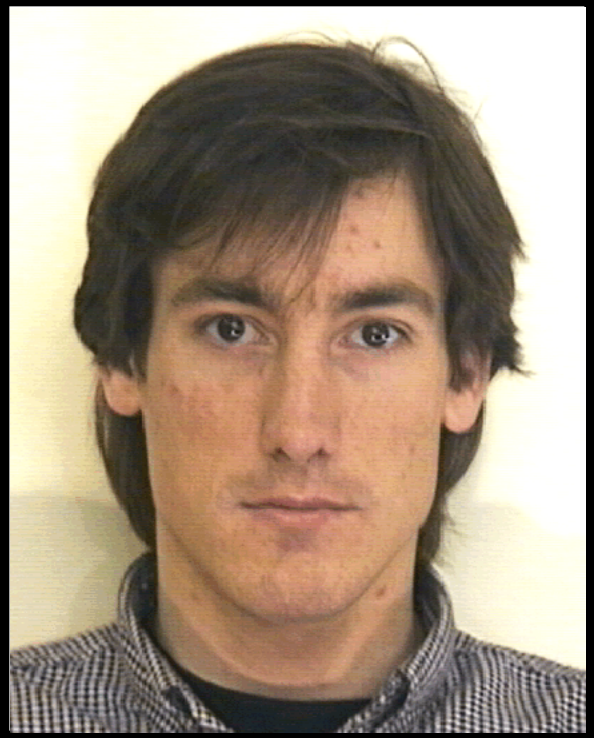






Example pictures 'positive' – taken from the International Affective Picture Set (IAPS)



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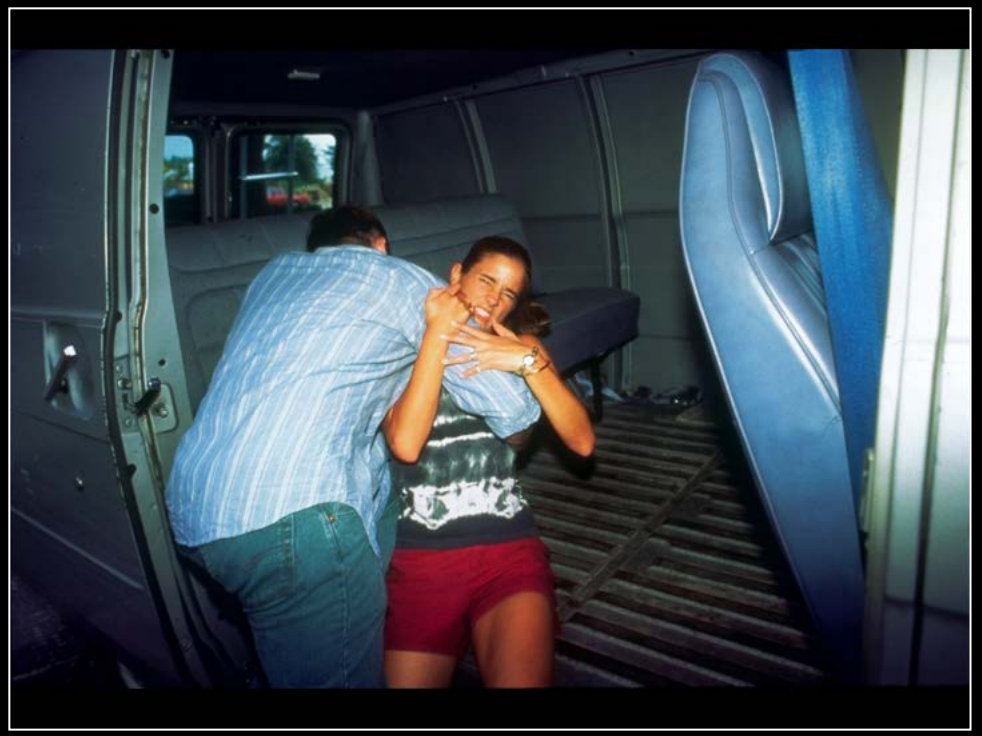

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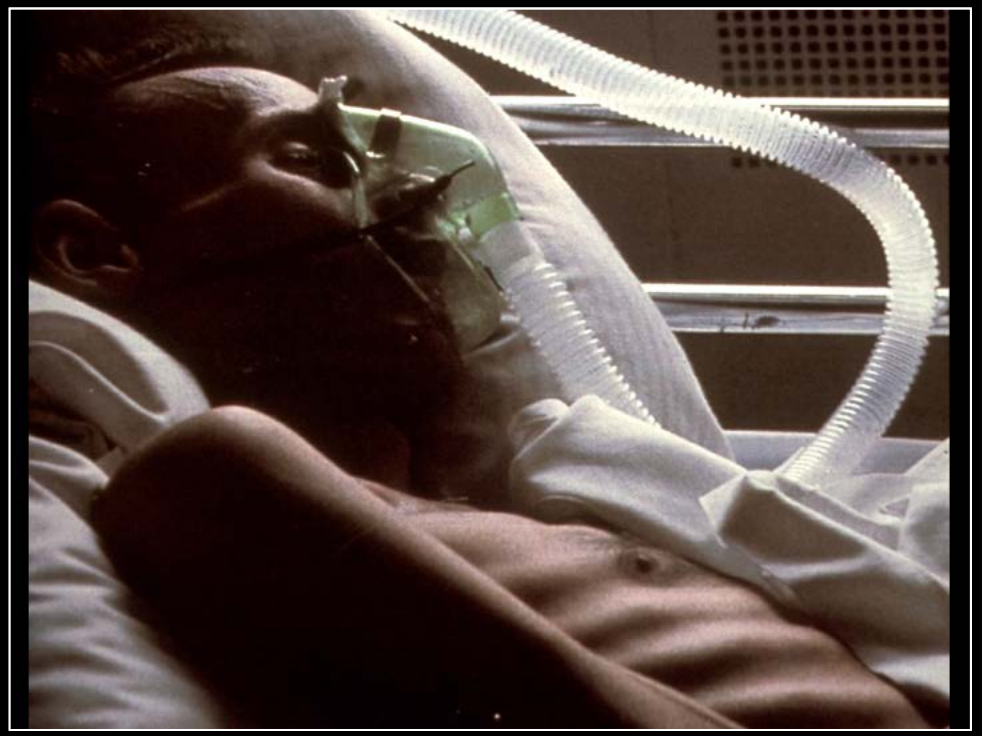

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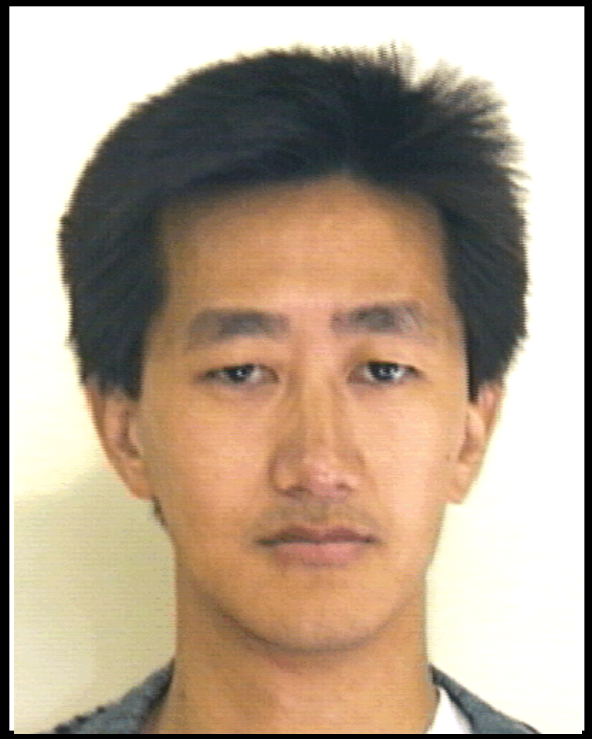

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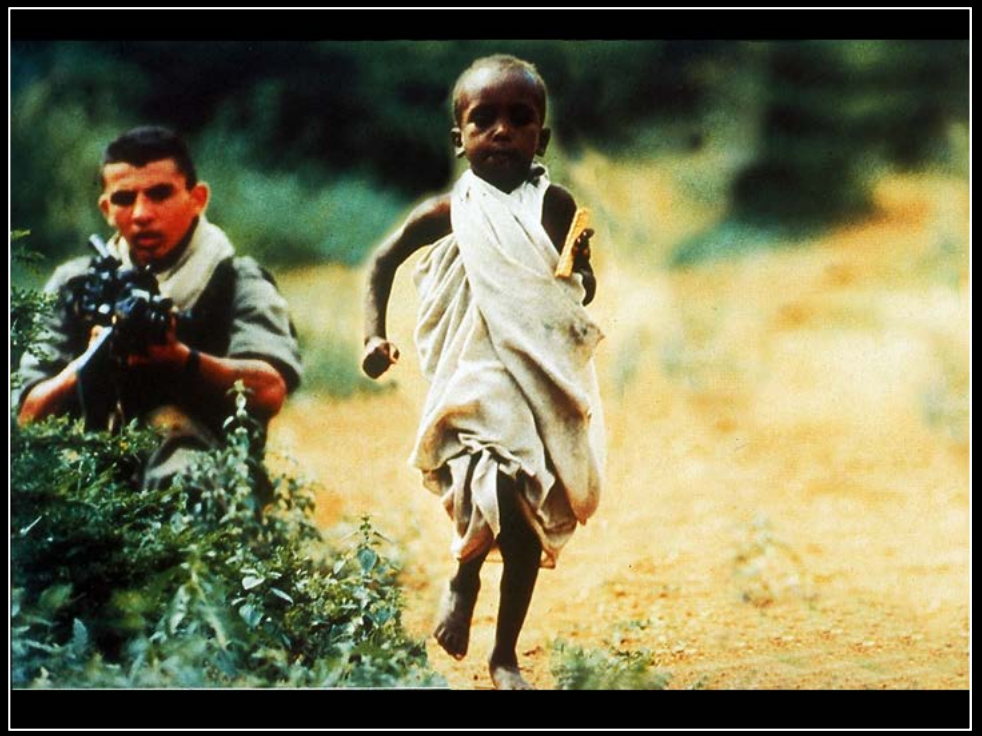

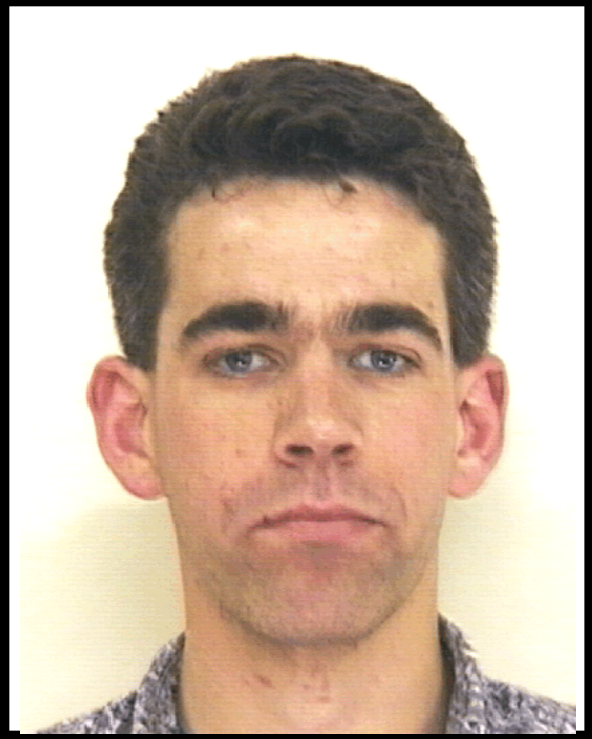

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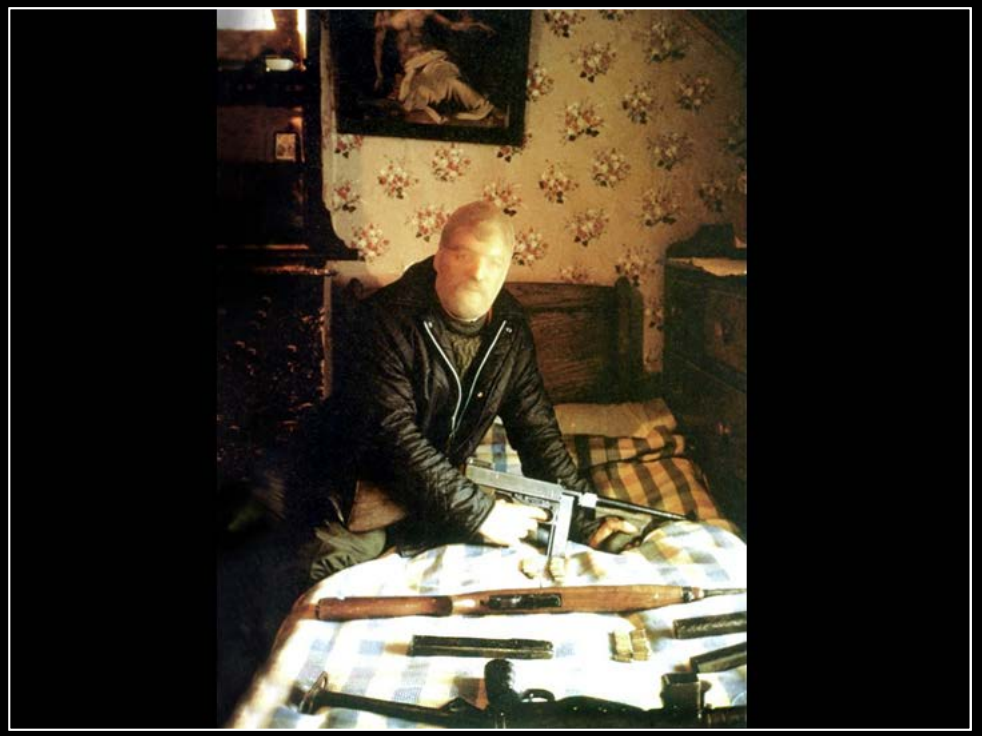

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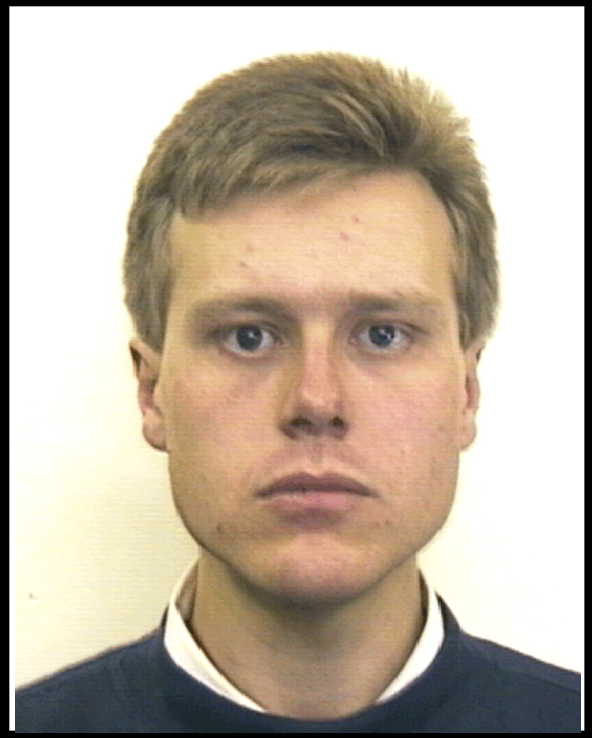

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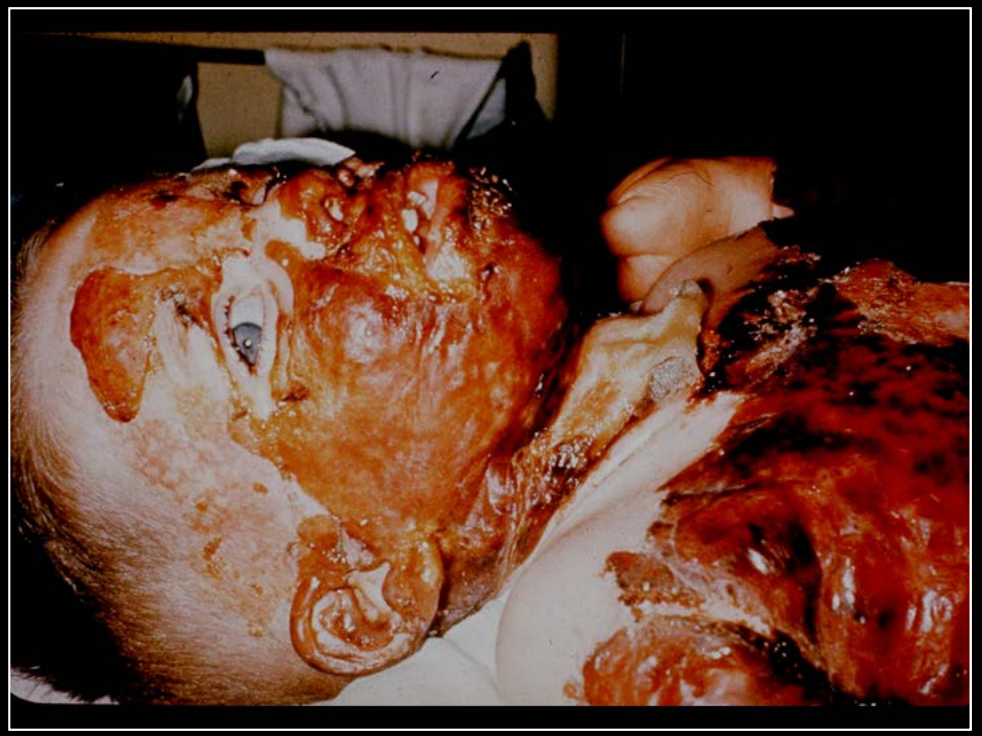

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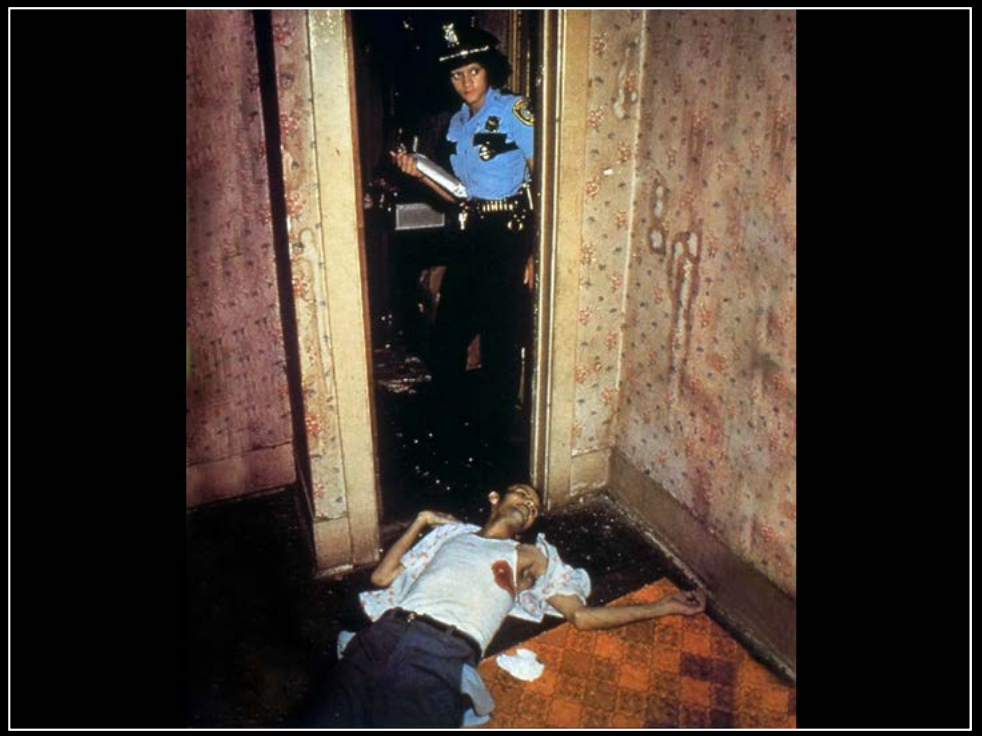

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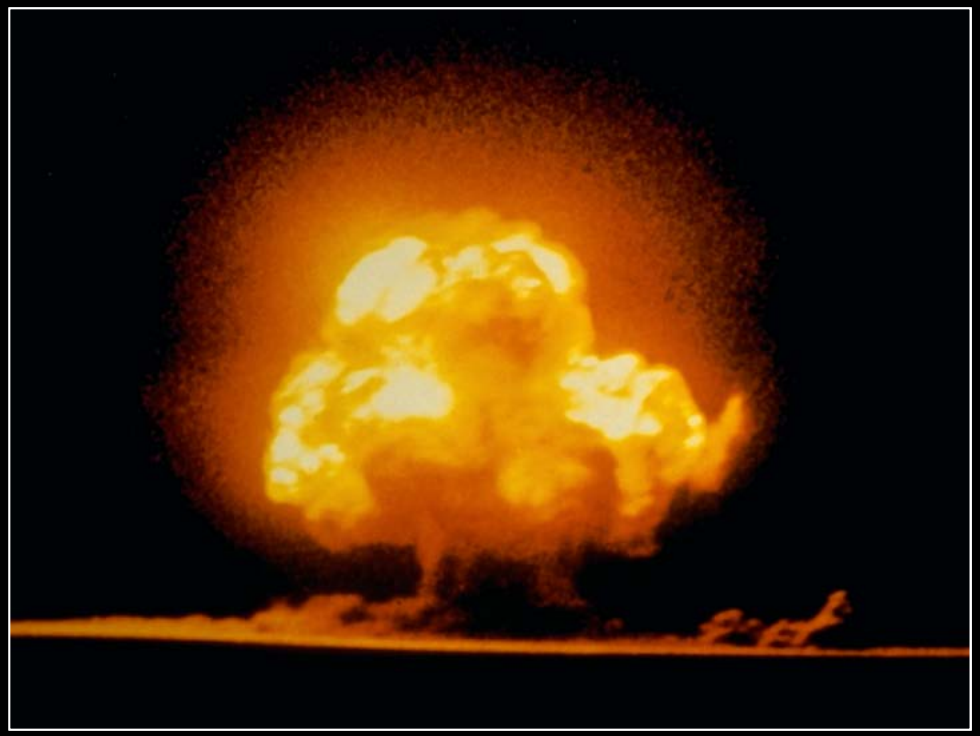

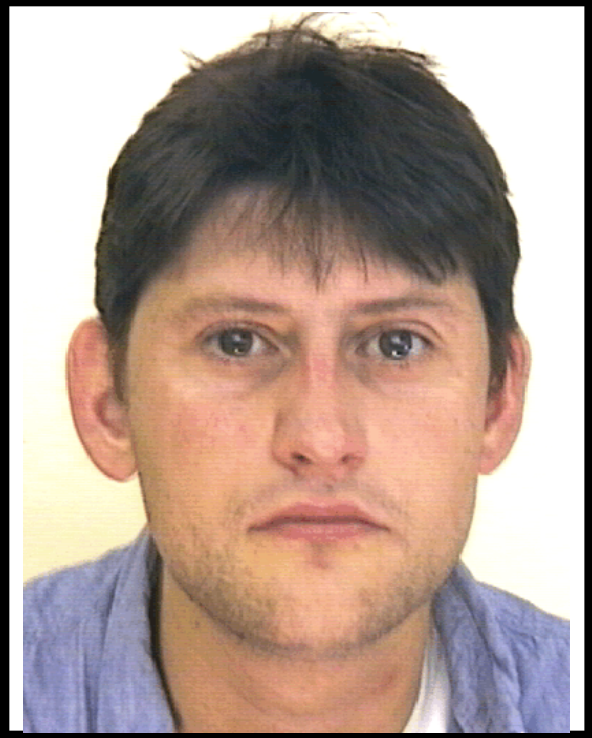

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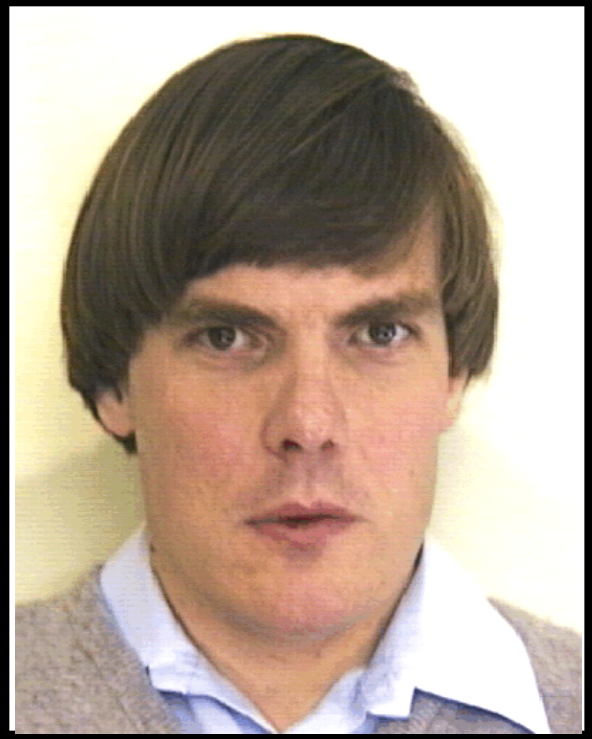

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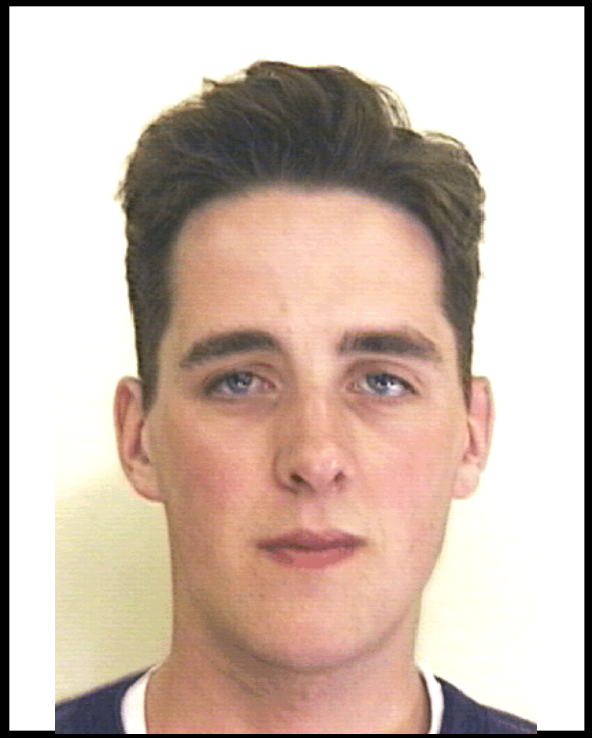

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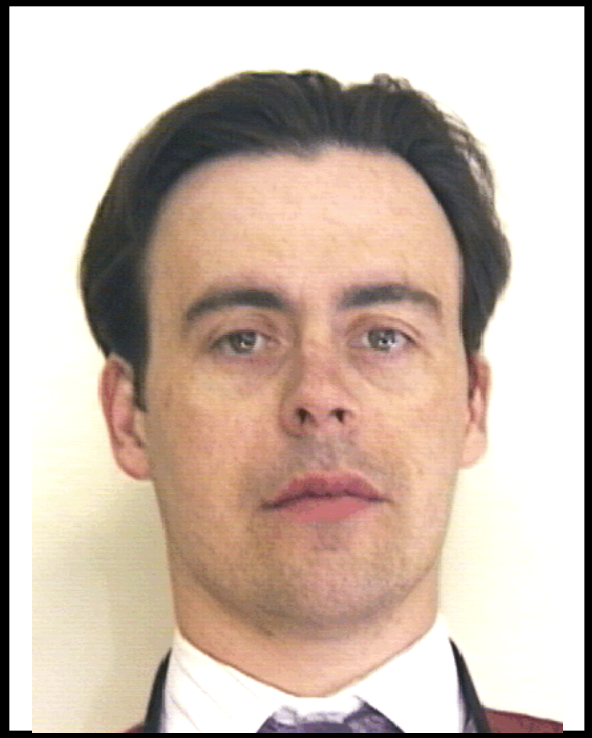

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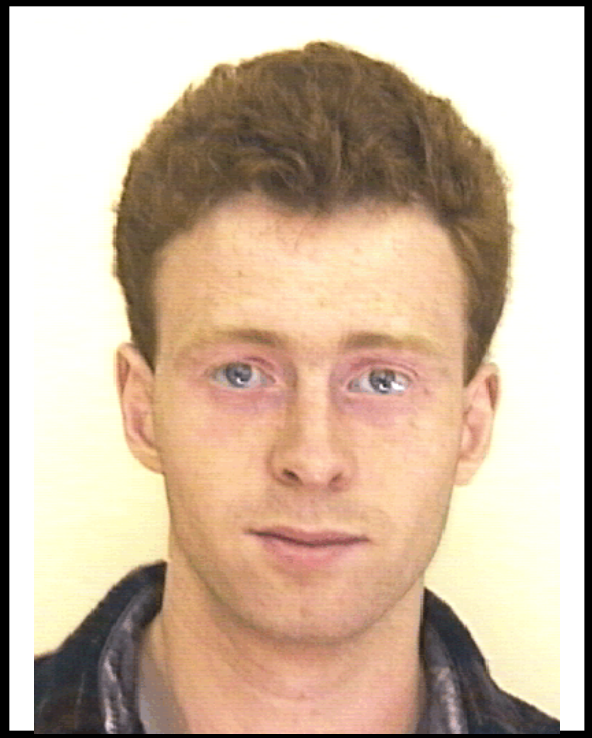

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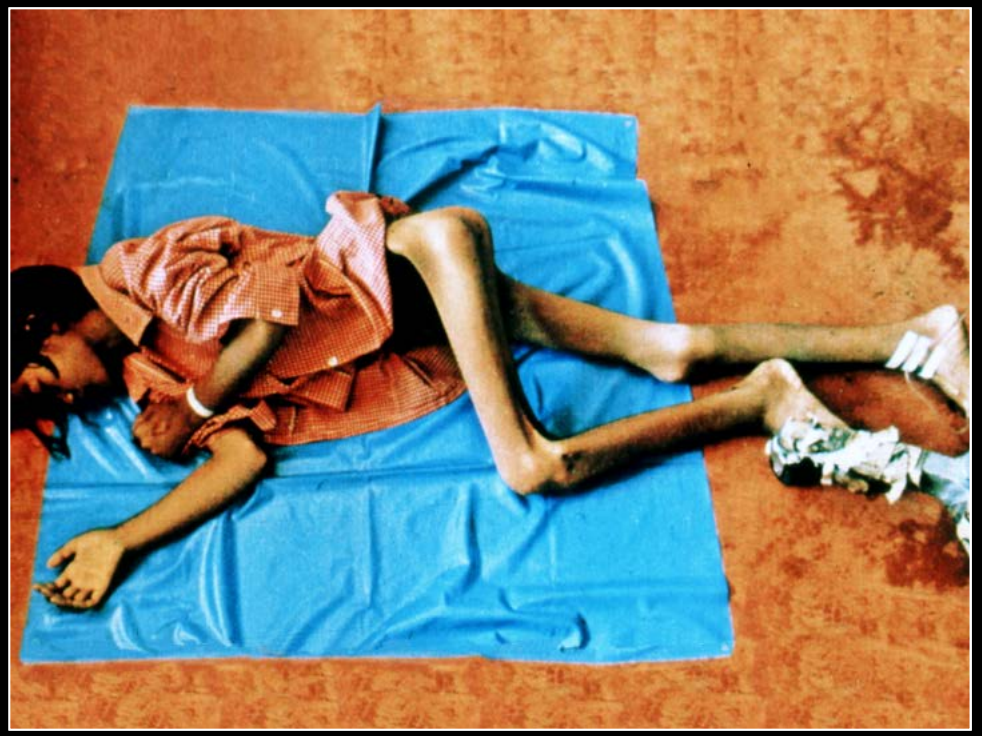

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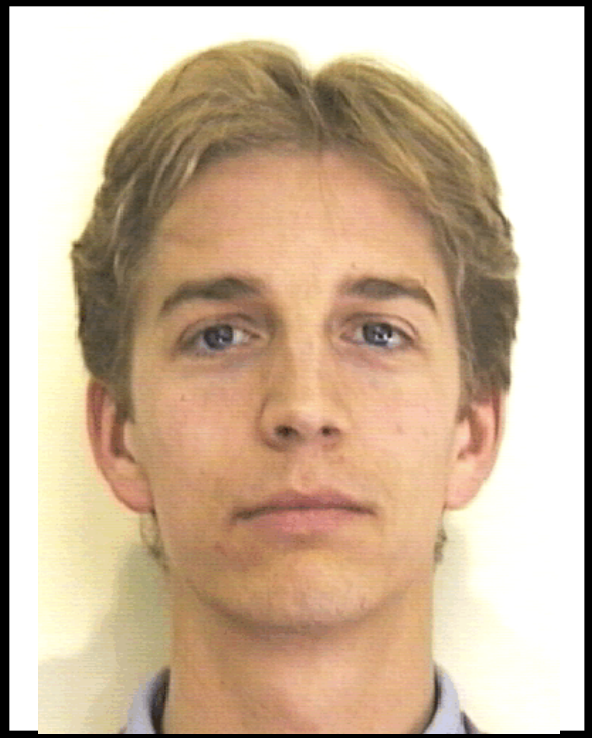

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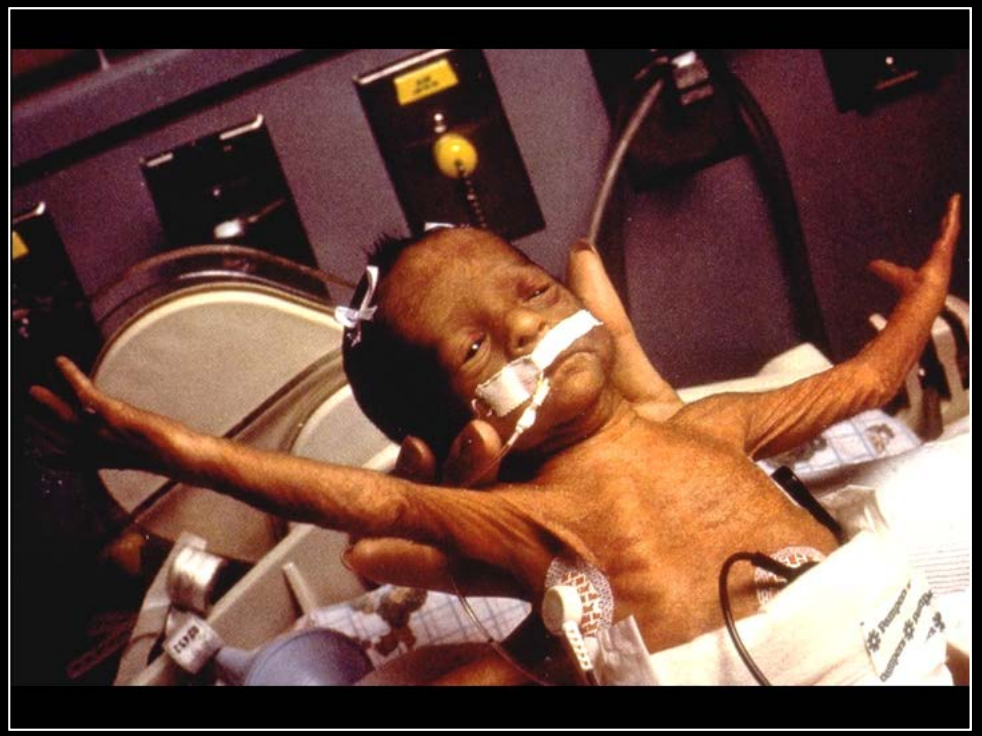

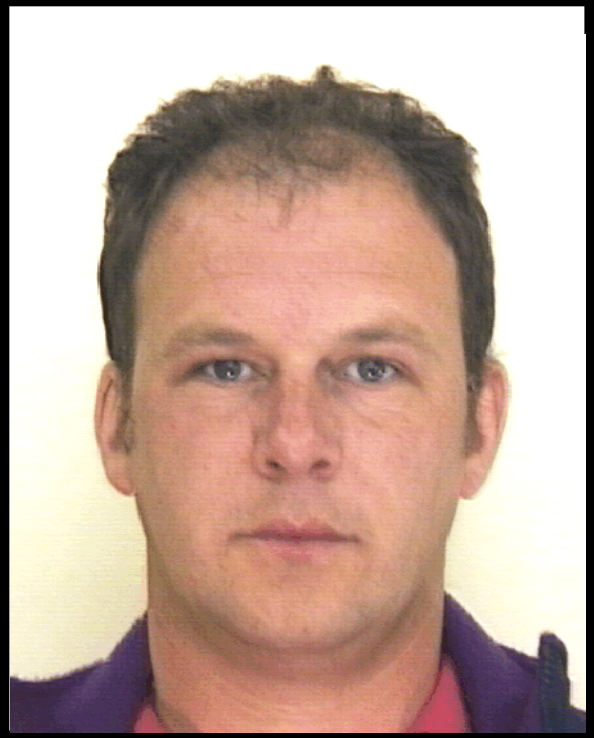

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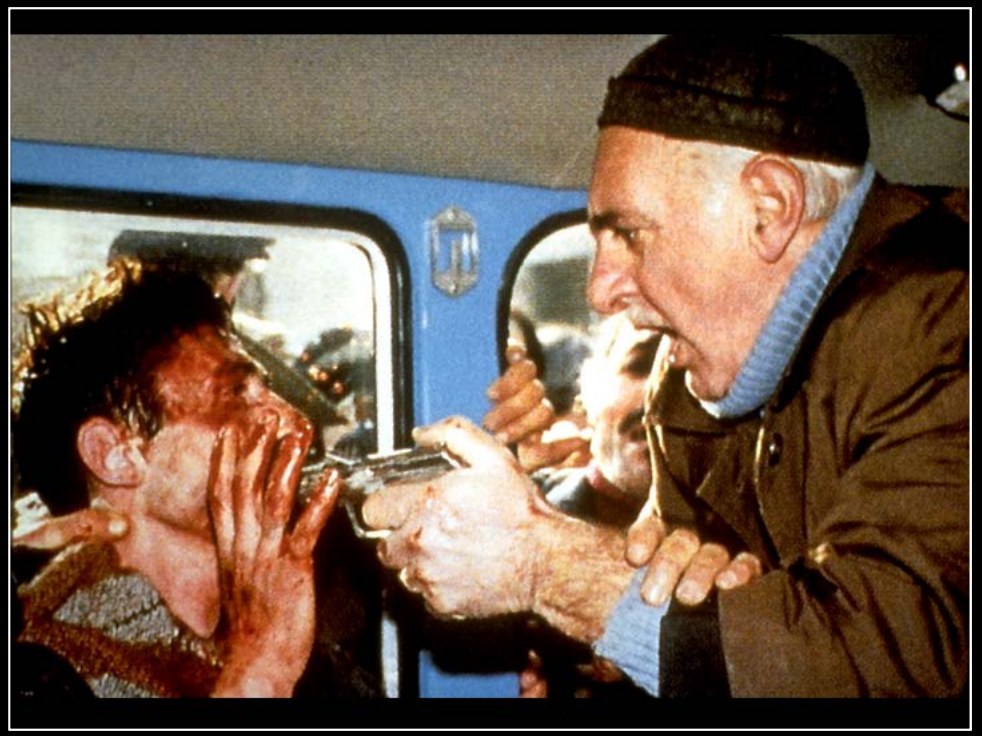

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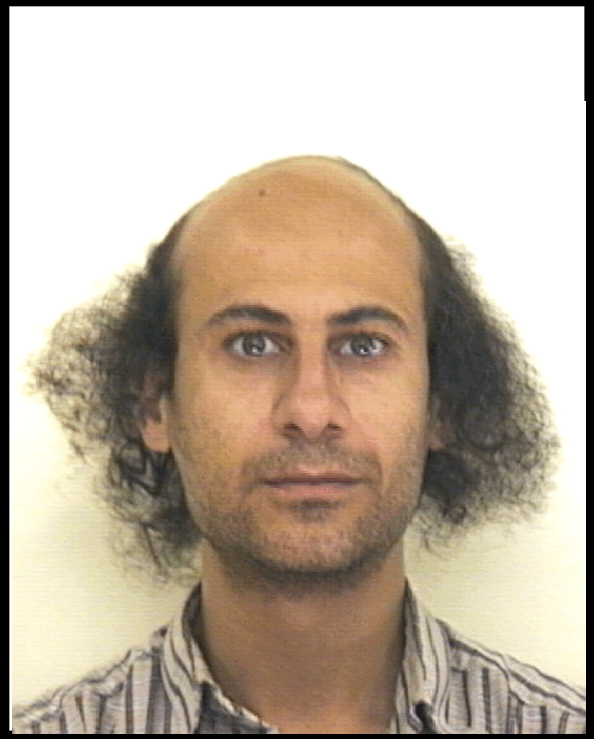

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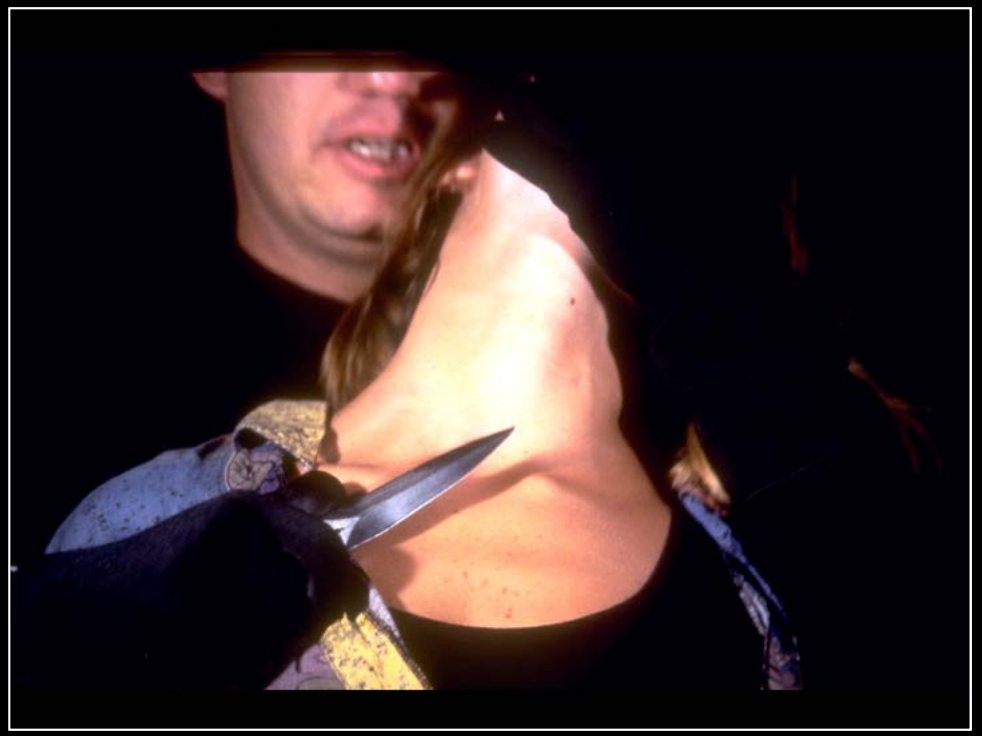


Trauma History Screen

Please complete the survey below.

Thank you!

The events below may or may not have happened to you. Select the relevant option if that kind of thing has happened to you. If you select any of the events: Input how many times something like that happened to you and describe what happened.

☐ A. A really bad car, boat, train, or airplane accident
☐ B. A really bad accident at work or home
☐ C. A hurricane, flood, earthquake, tornado, or fire
☐ D. Hit or kicked hard enough to injure - as a child
☐ E. Hit or kicked hard enough to injure - as an adult
☐ F. Forced or made to have sexual contact - as a child
☐ G. Forced or made to have sexual contact - as an adult
☐ H. Attack with a gun, knife, or weapon
☐ I. During military service - seeing something horrible or being badly scared
☐ J. Sudden death of close family or friend
☐ K. Seeing someone die suddenly or get badly hurt or killed
☐ L. Some other sudden event that made you feel very scared, helpless, or horrified.
☐ M. Sudden move or loss of home and possessions.
☐ N. Suddenly abandoned by spouse, partner, parent, or family.

You selected option A: A really bad car, boat, train, or airplane accident.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, where you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯

When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option B: A really bad accident at work or home.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option C: A hurricane, flood, earthquake, tornado, or fire.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option D: Hit or kicked hard enough to injure - as a child.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option E: Hit or kicked hard enough to injure - as an adult.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option F: Forced or made to have sexual contact - as a child.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option G: Forced or made to have sexual contact - as an adult.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option H: Attack with a gun, knife, or weapon.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option I: During military service - seeing something horrible or being badly scared.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option J: Sudden death of close family or friend.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option K: Seeing someone die suddenly or get badly hurt or killed.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option L: Some other sudden event that made you feel very scared, helpless, or horrified.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option M: Sudden move or loss of home and possessions.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

You selected option N: Suddenly abandoned by spouse, partner, parent, or family.

Did this really bother you emotionally?

◯ No
◯ Yes

Number of times something like this happened:

_____

Your age when this happened:

_____

Describe what happened:

	No	Yes
When this happened, did anyone get hurt or killed?	◯	◯
When this happened, were you afraid that you or someone else might get hurt or killed?	◯	◯
When this happened, did you feel very afraid, helpless, or horrified?	◯	◯
When this happened, did you feel unreal, spaced out, disoriented, or strange?	◯	◯

After this happened, how long were you bothered by it?

◯ not at all
◯ 1 week
◯ 2-3 weeks
◯ a month or more

How much did it bother you emotionally?

◯ not at all
◯ a little
◯ somewhat
◯ much
◯ very much

Instructions: Please read the following questions and circle the appropriate response from the options provided.

1) Do you think you received the active or placebo treatment? (circle one)

ACTIVE **PLACEBO**

2) Please rate your confidence in the answer you provided to question 1. For example, circling 50% indicates that you are 50% sure you received the treatment you circled in the previous question.

0% *(I have no idea which treatment I received)*

25%

50%

75%

100% *(I am absolutely positive that I received the treatment indicated above)*

Would you like to provide us with any feedback regarding the study and the light treatment? (e.g., Did you feel like your symptoms improved? If so, what was the most helpful aspect of the study?)

WASI-II Record Form

WECHSLER ABBREVIATED SCALE OF INTELLIGENCE® — SECOND EDITION

Calculation of Examinee's Age	Year	Month	Day
Test Date			
Test Age			

ID:

Sex: ☐ F ☐ M Handedness: ☐ R ☐ L

Address/School/Testing Site:

Highest Education/Grade:

Examiner Name:

Total Raw Score to *T* Score Conversion

Subtest	Raw Score	*T* Scores			
Block Design					
Vocabulary					
Matrix Reasoning					
Similarities					
Sum of *T* Scores					
		Verbal Comp.	Perc. Rsng.	Full Scale–4	Full Scale–2

Examinee Visual/Hearing Aids During Testing

Check type of aid examinee needed:	Used	Not Used
☐ Glasses	☐	☐
☐ Prescription Lenses	☐	☐
☐ Assisted Listening Device	☐	☐
☐ Other:	☐	☐

Sum of *T* Scores to Composite Score Conversion

Scale	Sum of *T* Scores	Composite Score		Percentile Rank	Confidence Interval 90% or 95%
Verbal Comp.		VCI			–
Perc. Rsng.		PRI			–
Full Scale–4		FSIQ–4			–
Full Scale–2		FSIQ–2			–

Ranges of Expected Scores

Scores	Confidence Level 90%	68%
FSIQ–4		
WISC-IV FSIQ	–	–
WAIS-IV FSIQ	–	–

Subtest *T* Score Profile

	Verbal Comprehension		Perceptual Reasoning	
	VC	SI	BD	MR
80				
75				
70				
65				
60				
55				
50				
45				
40				
35				
30				
25				
20				

Composite Score Profile

	VCI	PRI	FSIQ
160			
155			
150			
145			
140			
135			
130			
125			
120			
115			
110			
105			
100			
95			
90			
85			
80			
75			
70			
65			
60			
55			
50			
45			
40			

PEARSON

PsychCorp

3 4 5 6 7 8 9 10 11 12 A B C D E 282563-1 3

Product Number 0158981596

1. Block Design

(Time limit: See item)

Start
Ages 6–8: Item 1
Ages 9–90: Item 3

Reverse
Ages 9–90: Does not obtain a perfect score on *either* Item 3 or Item 4, administer the preceding items in reverse order until two consecutive perfect scores are obtained.

Discontinue
After 2 consecutive scores of 0.

Stop
Ages 6–8: After Item 11.

Record & Score
Items 1–4: Score 0, 1, or 2 points.
Items 5–13: Score 0, 4, 5, 6, or 7 points.

	Design	Presentation Method	Time Limit	Completion Time		Constructed Design		Score				
6–8	1. Examinee / Examiner	Model and Picture	30"	Trial 1	Trial 2	Trial 1	Trial 2	0	1	2		
	2.	Model and Picture	30"	Trial 1	Trial 2	Trial 1	Trial 2	0	1	2		
9–90	3.	Model and Picture	45"	Trial 1	Trial 2	Trial 1	Trial 2	0	1	2		
	4.	Model and Picture	45"	Trial 1	Trial 2	Trial 1	Trial 2	0	1	2		
	5.	Picture	60"					0	21–60: 4	16–20: 5	11–15: 6	1–10: 7
	6.	Picture	60"					0	21–60: 4	16–20: 5	11–15: 6	1–10: 7
	7.	Picture	60"					0	21–60: 4	16–20: 5	11–15: 6	1–10: 7
	8.	Picture	60"					0	21–60: 4	16–20: 5	11–15: 6	1–10: 7
	9.	Picture	120"					0	71–120: 4	46–70: 5	31–45: 6	1–30: 7
	10.	Picture	120"					0	61–120: 4	46–60: 5	36–45: 6	1–35: 7
	11.	Picture	120"					0	61–120: 4	46–60: 5	36–45: 6	1–35: 7
6–8 STOP	12.	Picture	120"					0	61–120: 4	46–60: 5	36–45: 6	1–35: 7
	13.	Picture	120"					0	101–120: 4	81–100: 5	56–80: 6	1–55: 7

Maximum Raw Score
Ages 6–8: 57
Ages 9–90: 71

Block Design Total Raw Score ____

2. Vocabulary

Start
Ages 6–90: Item 4

Reverse
Ages 6–90: Does not obtain a perfect score on *either* Item 4 or Item 5, administer the preceding items in reverse order until two consecutive perfect scores are obtained.

Discontinue
After 3 consecutive scores of 0.

Stop
Age 6: After Item 22.
Ages 7–11: After Item 25.
Ages 12–14: After Item 28.

Record & Score
Items 1–3: Score 0 or 1 point.
Items 4–5: Score 0 or 2 points.
Items 6–31: Score 0, 1, or 2 points.
See the Manual for sample responses.

	Item	Response	Score
	1. Fish		0 1
	2. Shovel		0 1
	3. Shell		0 1
6–90	†4. Shirt		0 2
	5. Car		0 2
	6. Lamp		0 1 2
	7. Bird		0 1 2
	8. Tongue		0 1 2
	9. Pet		0 1 2
	10. Lunch		0 1 2
	11. Bell		0 1 2
	12. Calendar		0 1 2
	13. Alligator		0 1 2
	14. Dance		0 1 2

†If the examinee provides a 2-point response that requires feedback or gives an incorrect (0 point) response, provide corrective feedback as instructed in the Manual.

continue

2. Vocabulary *(continued)*

Discontinue after 3 consecutive scores of 0.

	Item	Response	Score
	15. Summer		0 1 2
	16. Reveal		0 1 2
	17. Decade		0 1 2
	18. Entertain		0 1 2
	19. Tradition		0 1 2
	20. Enthusiastic		0 1 2
	21. Improvise		0 1 2
	22. Haste		0 1 2
6 STOP	23. Trend		0 1 2
	24. Impulse		0 1 2
	25. Ruminate		0 1 2
7–11 STOP	26. Mollify		0 1 2
	27. Extirpate		0 1 2
	28. Panacea		0 1 2
12–14 STOP			

continue

2. Vocabulary *(continued)*

Discontinue after **3** consecutive scores of 0.

Item	Response	Score
29. Perfunctory		0 1 2
30. Insipid		0 1 2
31. Pavid		0 1 2

Maximum Raw Score
Age 6: 41
Ages 7–11: 47
Ages 12–14: 53
Ages 15–90: 59

Vocabulary Total Raw Score ____

3. Matrix Reasoning

Start
Ages 6–8: Sample Items A & B, then Item 1
Ages 9–90: Sample Items A & B, then Item 4

Reverse
Ages 9–90: Does not obtain a perfect score on *either* Item 4 or Item 5, administer the preceding items in **reverse** order until two consecutive perfect scores are obtained.

Discontinue
After **3** consecutive scores of 0.

Stop
Ages 6–8: After Item 24.

Record & Score
Score **0** or **1** point.
Correct responses are in **color**.

	Item	Response	Score
6–90	SA.	1 **2** 3 4 5	
	SB.	1 2 **3** 4 5	
6–8	1.	1 **2** 3 4 5	0 1
	2.	**1** 2 3 4 5	0 1
	3.	1 2 **3** 4 5	0 1
9–90	4.	**1** 2 3 4 5	0 1
	5.	1 2 3 4 **5**	0 1
	6.	**1** 2 3 4 5	0 1
	7.	1 2 **3** 4 5	0 1
	8.	1 2 **3** 4 5	0 1
	9.	1 2 3 **4** 5	0 1
	10.	1 **2** 3 4 5	0 1
	11.	1 2 **3** 4 5	0 1
	12.	1 2 3 **4** 5	0 1
	13.	**1** 2 3 4 5	0 1
	14.	1 2 3 **4** 5	0 1
	15.	1 **2** 3 4 5	0 1
	16.	1 2 3 4 **5**	0 1
	17.	1 2 3 **4** 5	0 1
	18.	1 **2** 3 4 5	0 1
	19.	1 2 3 **4** 5	0 1
	20.	1 **2** 3 4 5	0 1
	21.	1 2 **3** 4 5	0 1
	22.	1 2 **3** 4 5	0 1
	23.	**1** 2 3 4 5	0 1
6–8 STOP	24.	1 2 3 **4** 5	0 1
	25.	1 2 3 **4** 5	0 1
	26.	1 **2** 3 4 5	0 1
	27.	1 2 3 4 **5**	0 1
	28.	1 2 3 4 **5**	0 1
	29.	**1** 2 3 4 5	0 1
	30.	1 **2** 3 4 5	0 1

Maximum Raw Score
Ages 6–8: 24
Ages 9–90: 30

Matrix Reasoning Total Raw Score ____

4. Similarities

Start
Ages 6–8: Item 1
Ages 9–90: Item 4

Reverse
Ages 9–90: Does not obtain a perfect score on *either* Item 4 or Item 5, administer the preceding items in **reverse** order until two consecutive perfect scores are obtained.

Discontinue
After **3** consecutive scores of 0.

Stop
Ages 6–8: After Item 22.

Record & Score
Items 1–3: Score **0** or **1** point. Correct responses are in **color**.
Items 4–5: Score **0** or **2** points.
Items 6–24: Score **0**, **1**, or **2** points. See Manual for sample responses.

	Picture Item	Response	Score
6–8	†1.	1 2 **3** 4 5	0 1
	2.	1 2 3 **4** 5	0 1
	3.	1 **2** 3 4 5	0 1

	Verbal Items	Response	Score
9–90	§† 4. Green–Blue		0 2
	§† 5. Square–Triangle		0 2
	6. Cow–Bear		0 1 2
	7. Shirt–Jacket		0 1 2
	8. Pen–Crayon		0 1 2
	9. Hat–Umbrella		0 1 2
	10. Airplane–Bus		0 1 2
	11. Door–Window		0 1 2
	12. Child–Adult		0 1 2

§If the examinee provides a response that suggests he or she does not understand the task, provide the specified prompt in the Manual.

†If the examinee provides a 2-point response that requires feedback or provides an incorrect (0 point) response, provide corrective feedback as instructed in the Manual.

continue

4. Similarities *(continued)*

Discontinue after **3** consecutive scores of 0.

Verbal Items	Response	Score
13. Shoulder–Ankle		0 1 2
14. Love–Hate		0 1 2
15. Smooth–Rough		0 1 2
16. Hand–Flag		0 1 2
17. Wall–Line		0 1 2
18. Heat–Wind		0 1 2
19. More–Less		0 1 2
20. Shadow–Echo		0 1 2
21. Tradition–Habit		0 1 2
22. Peace–War		0 1 2
6–8 STOP 23. Time–Progress		0 1 2
24. Memory–Practice		0 1 2

Maximum Raw Score
Ages 6–8: 41
Ages 9–90: 45

Similarities Total Raw Score ____ 610

WASI®-II

WECHSLER ABBREVIATED SCALE OF INTELLIGENCE®— SECOND EDITION

Examinee Name: _____ Age: _____

Parent/Guardian Name: _____

Examiner Name: _____

Record Form

Behavioral Observations

Referral source/Reason for referral/Presenting complaint(s)

Physical appearance

Language (e.g., first/native language, other language, English fluency, expressive and receptive language ability, articulation)

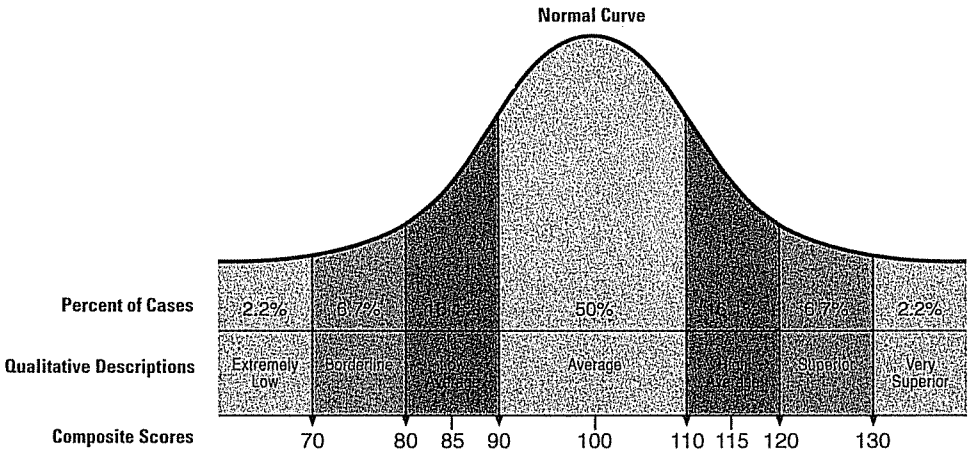
Attention and concentration

Attitude toward testing (e.g., rapport, eager to speak, working habits, interest, motivation, reaction to success/failure)

Affect/Mood

Unusual behaviors/Verbalizations (e.g., perseverations, stereotypic movements, bizarre and atypical verbalizations)

Other notes



PEARSON

Pearson Executive Office 5601 Green Valley Drive Bloomington, MN 55437

800.627.7271 www.PsychCorp.com

WRAT4 BLUE TEST FORM

Name _____ Gender _____

Grade _____ Examiner _____

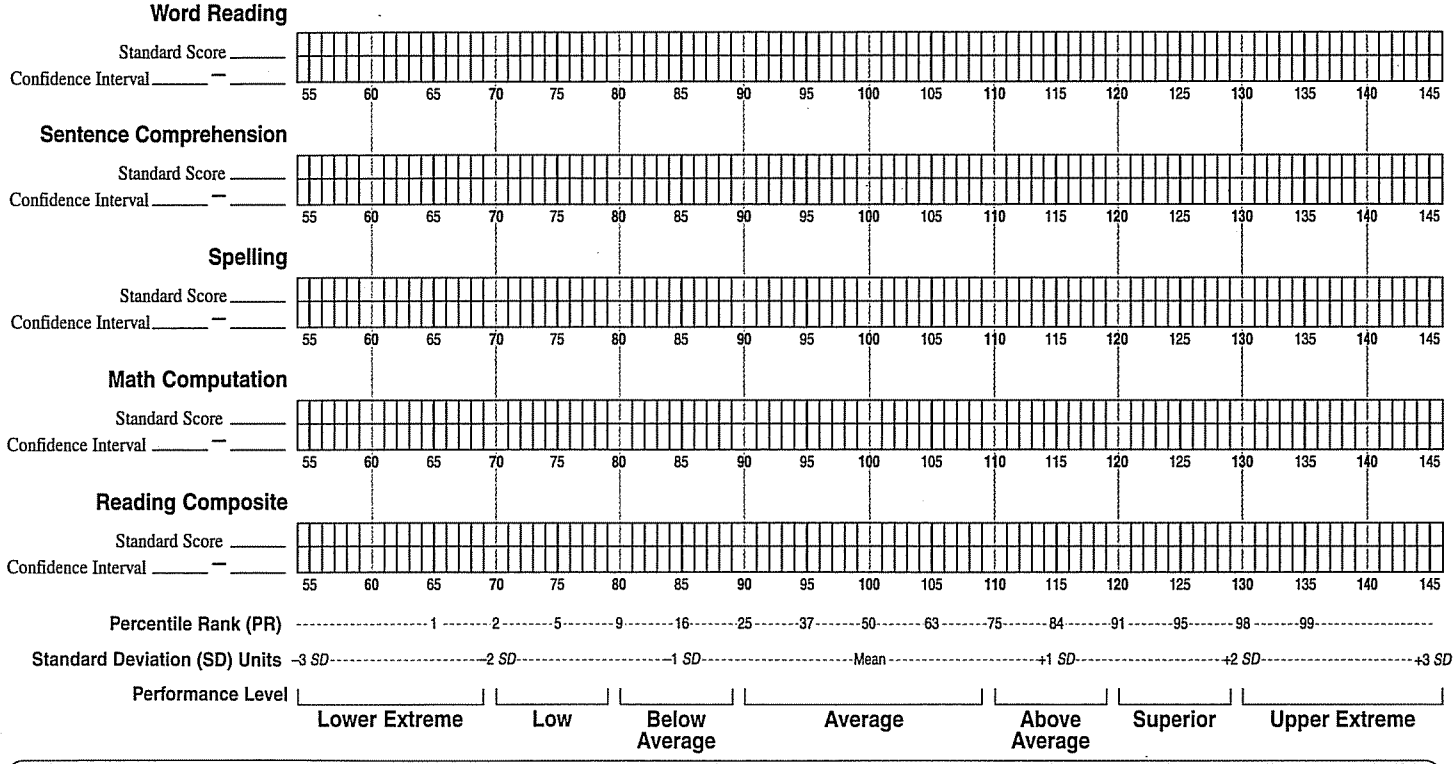
	Year	Month	Day
Date of Test			
Date of Birth			
Age			

Score Summary Table

Subtest/Composite	Raw Score	Standard Score Norms: ☐ Age ☐ Grade (☐ Fall, ☐ Spring)	Confidence Interval ☐ 85% ☐ 90% ☐ 95%	%ile Rank	Optional Scores ☐ Grade Equivalent ☐ NCE ☐ Stanine
Word Reading			_____ – _____		
Sentence Comprehension			_____ – _____		
Spelling			_____ – _____		
Math Computation			_____ – _____		
Reading Composite*			_____ – _____		

*Reading Composite Raw Score = Word Reading Standard Score + Sentence Comprehension Standard Score.

Standard Score Profile



Standard Score Comparison Table

Score Comparisons > = < (circle one)	Score Difference	Significance Level	Prevalence in Standardization Sample
Word Reading ☐ > = < ☐ Sentence Comprehension		ns .15 .10 .05 .01	>25% 25% 20% 15% 10% 5% 1%
Word Reading ☐ > = < ☐ Spelling		ns .15 .10 .05 .01	>25% 25% 20% 15% 10% 5% 1%
Word Reading ☐ > = < ☐ Math Computation		ns .15 .10 .05 .01	>25% 25% 20% 15% 10% 5% 1%
Sentence Comprehension ☐ > = < ☐ Spelling		ns .15 .10 .05 .01	>25% 25% 20% 15% 10% 5% 1%
Sentence Comprehension ☐ > = < ☐ Math Computation		ns .15 .10 .05 .01	>25% 25% 20% 15% 10% 5% 1%
Spelling ☐ > = < ☐ Math Computation		ns .15 .10 .05 .01	>25% 25% 20% 15% 10% 5% 1%

WORD READING SUBTEST

AGES 7 OR YOUNGER: Administer Part 1: Letter Reading first, followed by Part 2: Word Reading. Discontinue testing if a Participant has responded incorrectly to 10 consecutive items (*10 RULE*).

AGES 8 OR OLDER: Administer Part 2: Word Reading first. Discontinue the Word Reading section if the Participant has answered 10 consecutive items incorrectly (*10 RULE*). If the Participant has correctly answered 5 or more items on the Word Reading section before meeting the discontinue criterion, do not administer the preliminary Letter Reading section. If the Participant did not answer at least 5 items correctly on the Word Reading section, then administer Part 1: Letter Reading (*5 RULE*).

Part 1: Letter Reading Administration Instructions

After handing the Participant the Blue Word Reading List, say, **I want you to look at the letters on this line.** (Point to the row of letters at the top of the card) **Read to me the letters one-by-one across the line.** After the Participant has finished, say, **That's all. Now let's do something different.**

A	B	O	S	E	R	T	H	U	P	I	V	Z	J	Q
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)

Part 2: Word Reading Administration Instructions

After handing the Participant the Blue Word Reading List, say, **Look at each of these words carefully.** (Point to the words) **Read the words across the page so I can hear you. When you finish the first line, go right on to the second line, and so on down the page until you finish or I tell you to stop. Read slowly and say the words clearly.** Allow 10 seconds for the Participant to respond to each word. If there is no response after 10 seconds, say, **OK, try the next one.** If you did not hear a word clearly, say, **I could not hear you clearly. Please say the word again just as you did the first time.** When the Participant has finished the Word Reading section, say, **That's all. Good job. Thanks. Now we are going to do something else.**

1. **cat**
   kat
2. **in**
   in
3. **book**
   buuk
4. **tree**
   tree
5. **how**
   how
6. **animal**
   an-i-mal
7. **hair**
   hair
8. **spell**
   spel
9. **even**
   ee-vĕn
10. **size**
    sīz
11. **finger**
    fing-gĕr
12. **felt**
    felt
13. **laugh**
    laf
14. **straight**
    strayt
15. **stretch**
    strech
16. **split**
    split
17. **lame**
    laym
18. **bulk**
    bulk
19. **knowledge**
    nol-ij
20. **abuse**
    ă-**byoos**, -**byooz**
21. **ceiling**
    see-ling
22. **diagram**
    di-ă-gram
23. **doubt**
    dowt
24. **collapse**
    kŏ-**laps**
25. **gigantic**
    ji-**gan**-tic
26. **contemporary**
    kŏn-**tem**-pŏ-rer-ee
27. **contagious**
    kŏn-**tay**-jŭs
28. **exterior**
    ik-**steer**-i-ŏr
29. **horizon**
    hŏ-**rī**-zŏn
30. **triumph**
    trī-ŭmf
31. **alcove**
    al-kohv
32. **tranquility**
    trang-**kwil**-i-tee
33. **efficiency**
    i-**fish**-ĕnt-see
34. **inquisitive**
    in-**kwiz**-i-tiv
35. **bibliography**
    bib-li-**og**-ră-fee
36. **municipal**
    myoo-**nis**-i-pal
37. **unanimous**
    you-**nan**-i-mŭs
38. **discretionary**
    di-**skresh**-ŏ-ner-ee
39. **seismograph**
    sīz-mŏ-graf
40. **benign**
    bi-**nīn**
41. **itinerary**
    ī-**tin**-ĕ-rer-ee
42. **heresy**
    her-ĕ-see
43. **usurp**
    yoo-**surp**, -**zurp**
44. **stratagem**
    strat-ă-jĕm
45. **pseudonym**
    soo-dŏ-nim
46. **irascible**
    i-**ras**-i-bel
47. **heinous**
    hay-nŭs
48. **poignant**
    poin-yănt
49. **disingenuous**
    dis-in-**jen**-yoo-ŭs
50. **covetousness**
    kuv-ĕ-tŭs-nes
51. **omniscient**
    om-**nish**-ĕnt
52. **oligarchy**
    ol-i-gahr-kee
53. **egregious**
    i-**gree**-jŭs
54. **assuage**
    ă-**swayj**
55. **terpsichorean**
    turp-si-kŏ-**ree**-ăn

Letter Reading Raw Score	/15	
+ **Word Reading Raw Score***	/55	
Word Reading Total Raw Score	/70	

Next administer the Sentence Comprehension subtest, if applicable.

*Use this value for determining starting point on Sentence Comprehension subtest.

SPELLING SUBTEST

AGES 7 OR YOUNGER: Administer Part 1: Letter Writing first, followed by Part 2: Spelling. The Spelling section must be administered individually for participants ages 7 and younger. On the Spelling section, the test should be discontinued after the Participant spells 10 consecutive words incorrectly (*10 RULE*).

AGES 8 OR OLDER: Administer Part 2: Spelling first. Discontinue if 10 consecutive errors have been made (*10 RULE*). If the Participant has correctly spelled 5 or more items on the Spelling section before meeting the discontinue criterion, the preliminary Letter Writing section should not be administered. If the Participant does not spell at least 5 words correctly on the Spelling section, then administer Part 1: Letter Writing (*5 RULE*).

WORD READING SUBTEST

AGES 7 OR YOUNGER: Administer Part 1: Letter Reading first, followed by Part 2: Word Reading. Discontinue testing if a Participant has responded incorrectly to 10 consecutive items (*10 RULE*).

AGES 8 OR OLDER: Administer Part 2: Word Reading first. Discontinue the Word Reading section if the Participant has answered 10 consecutive items incorrectly (*10 RULE*). If the Participant has correctly answered 5 or more items on the Word Reading section before meeting the discontinue criterion, do not administer the preliminary Letter Reading section. If the Participant did not answer at least 5 items correctly on the Word Reading section, then administer Part 1: Letter Reading (*5 RULE*).

Part 1: Letter Reading Administration Instructions

After handing the Participant the Blue Word Reading List, say, **I want you to look at the letters on this line.** (Point to the row of letters at the top of the card) **Read to me the letters one-by-one across the line.** After the Participant has finished, say, **That's all. Now let's do something different.**

A	B	O	S	E	R	T	H	U	P	I	V	Z	J	Q
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)

Part 2: Word Reading Administration Instructions

After handing the Participant the Blue Word Reading List, say, **Look at each of these words carefully.** (Point to the words) **Read the words across the page so I can hear you. When you finish the first line, go right on to the second line, and so on down the page until you finish or I tell you to stop. Read slowly and say the words clearly.** Allow 10 seconds for the Participant to respond to each word. If there is no response after 10 seconds, say, **OK, try the next one.** If you did not hear a word clearly, say, **I could not hear you clearly. Please say the word again just as you did the first time.** When the Participant has finished the Word Reading section, say, **That's all. Good job. Thanks. Now we are going to do something else.**

1. **cat**
   kat
2. **in**
   in
3. **book**
   buuk
4. **tree**
   tree
5. **how**
   how
6. **animal**
   an-i-mal
7. **hair**
   hair
8. **spell**
   spel
9. **even**
   ee-ven
10. **size**
    siz
11. **finger**
    fing-ger
12. **felt**
    felt
13. **laugh**
    laf
14. **straight**
    strayt
15. **stretch**
    strech
16. **split**
    split
17. **lame**
    laym
18. **bulk**
    bulk
19. **knowledge**
    nol-ij
20. **abuse**
    a-**byoos**, -**byooz**
21. **ceiling**
    see-ling
22. **diagram**
    di-a-gram
23. **doubt**
    dowt
24. **collapse**
    ko-**laps**
25. **gigantic**
    ji-**gan**-tic
26. **contemporary**
    kon-**tem**-po-rer-ee
27. **contagious**
    kon-**tay**-jus
28. **exterior**
    ik-**steer**-i-or
29. **horizon**
    ho-**ri**-zon
30. **triumph**
    tri-umf
31. **alcove**
    al-kohv
32. **tranquility**
    trang-**kwil**-i-tee
33. **efficiency**
    i-**fish**-ent-see
34. **inquisitive**
    in-**kwiz**-i-tiv
35. **bibliography**
    bib-li-**og**-ra-fee
36. **municipal**
    myoo-**nis**-i-pal
37. **unanimous**
    you-**nan**-i-mus
38. **discretionary**
    di-**skresh**-o-ner-ee
39. **seismograph**
    siz-mo-graf
40. **benign**
    bi-**nin**
41. **itinerary**
    i-**tin**-e-rer-ee
42. **heresy**
    her-e-see
43. **usurp**
    yoo-**surp**, -**zurp**
44. **stratagem**
    strat-a-jem
45. **pseudonym**
    soo-do-nim
46. **irascible**
    i-**ras**-i-bel
47. **heinous**
    hay-nus
48. **poignant**
    poin-yant
49. **disingenuous**
    dis-in-**jen**-yoo-us
50. **covetousness**
    kuv-e-tus-nes
51. **omniscient**
    om-**nish**-ent
52. **oligarchy**
    ol-i-gahr-kee
53. **egregious**
    i-**gree**-jus
54. **assuage**
    a-**swayj**
55. **terpsichorean**
    turp-si-ko-**ree**-an

Letter Reading Raw Score		/15
+ **Word Reading Raw Score***		/55
Word Reading Total Raw Score		/70

Next administer the Sentence Comprehension subtest, if applicable.
*Use this value for determining starting point on Sentence Comprehension subtest.

SPELLING SUBTEST

AGES 7 OR YOUNGER: Administer Part 1: Letter Writing first, followed by Part 2: Spelling. The Spelling section must be administered individually for participants ages 7 and younger. On the Spelling section, the test should be discontinued after the Participant spells 10 consecutive words incorrectly (*10 RULE*).

AGES 8 OR OLDER: Administer Part 2: Spelling first. Discontinue if 10 consecutive errors have been made (*10 RULE*). If the Participant has correctly spelled 5 or more items on the Spelling section before meeting the discontinue criterion, the preliminary Letter Writing section should not be administered. If the Participant does not spell at least 5 words correctly on the Spelling section, then administer Part 1: Letter Writing (*5 RULE*).

Combined Form Score Summary Sheet

WORD READING

Part 1: Letter Reading*	/15
+	
Blue Form Part 2: Word Reading	/55
+	
Green Form Part 2: Word Reading	/55
Combined Form Word Reading Raw Score	/125

SPELLING

Part 1: Letter Writing*	/15
+	
Blue Form Part 2: Spelling	/42
+	
Green Form Part 2: Spelling	/42
Combined Form Spelling Raw Score	/99

SENTENCE COMPREHENSION

Blue Form Sentence Comprehension	/50
+	
Green Form Sentence Comprehension	/50
Combined Form Sentence Comprehension Raw Score	/100

MATH COMPUTATION

Part 1: Oral Math*	/15
+	
Blue Form Part 2: Math Computation	/40
+	
Green Form Part 2: Math Computation	/40
Combined Form Math Computation Raw Score	/95

*Because the preliminary sections—Letter Reading, Letter Writing, and Oral Math—of each form contain the same items these scores should only be counted once in determining the Combined Subtest raw score. If the preliminary sections were administered twice, use only the higher of the two scores.

Combined Form Score Summary Table

Subtest/Composite	Raw Score	Standard Score Norms: ☐ Age ☐ Grade (☐ Fall, ☐ Spring)	Confidence Interval ☐ 85% ☐ 90% ☐ 95%	%ile Rank	Optional Scores ☐ Grade Equivalent ☐ NCE ☐ Stanine
Word Reading			_____ – _____		
Sentence Comprehension			_____ – _____		
Spelling			_____ – _____		
Math Computation			_____ – _____		
Reading Composite*			_____ – _____		

*Reading Composite Raw Score = Word Reading Standard Score + Sentence Comprehension Standard Score.

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Appendix C. Mixed Models

Linear mixed model results for 3-way interactions of interest, classified by the associated main figure within section 3.

3.13)

RBANS Total Score Score Change Across Intervention by Trauma Exposure Type

	RBANS Total Score		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	89.00	84.36 – 93.64	**<0.001**
study_phase.x [Post-Treatment]	0.54	-2.36 – 3.43	0.717
group [Blue]	3.84	-2.41 – 10.09	0.228
Trauma Exposure Type [Indirect Exposure]	3.25	-7.00 – 13.50	0.534
study_phase.x [Post-Treatment] * group [Blue]	2.49	-1.38 – 6.36	0.207
study_phase.x [Post-Treatment] * Trauma Exposure Type [Indirect Exposure]	6.09	-0.22 – 12.40	0.058
group [Blue] * Trauma Exposure Type [Indirect Exposure]	0.71	-15.29 – 16.71	0.931
(study_phase.x [Post-Treatment] * group [Blue]) * Trauma Exposure Type [Indirect Exposure]	-13.92	-23.75 – -4.08	**0.006**
Random Effects			
σ^2	32.73		
$\tau_{00\ participantid}$	141.03		
ICC	0.81		
$N_{\ participantid}$	82		
Observations	163		
Marginal R^2 / Conditional R^2	0.051 / 0.821		

3.15)

PCL-5 Total Score Change Across Intervention by Sex

	PCL-5 Total		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	45.49	38.43 – 53.84	**<0.001**
study_phase [Post-Treatment]	0.74	0.63 – 0.87	**<0.001**
group [Blue]	1.03	0.81 – 1.30	0.833
sex [Male]	0.84	0.62 – 1.14	0.259
study_phase [Post-Treatment] * group [Blue]	0.79	0.63 – 1.00	**0.045**
study_phase [Post-Treatment] * sex [Male]	0.76	0.57 – 1.03	0.079
group [Blue] * sex [Male]	1.06	0.70 – 1.61	0.782
(study_phase [Post-Treatment] * group [Blue]) * sex [Male]	1.76	1.17 – 2.64	**0.006**
Random Effects			
σ^2	0.09		
$\tau_{00\ participantid}$	0.11		
ICC	0.54		
$N_{\ participantid}$	82		
Observations	163		
Marginal R^2 / Conditional R^2	0.218 / 0.639		

3.19)

BDI Total Score Change Across Intervention by CAPS Severity

	BDI Total		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	5.75	-3.04 – 14.55	0.200
study_phase [Post-Treatment]	-7.49	-16.26 – 1.28	0.094
group [Blue]	-5.00	-19.03 – 9.03	0.485
CAPS Severity	0.50	0.25 – 0.76	**<0.001**
study_phase [Post-Treatment] * group [Blue]	12.56	-0.59 – 25.72	0.061
study_phase [Post-Treatment] * CAPS Severity	0.22	-0.08 – 0.52	0.148
group [Blue] * CAPS Severity	0.21	-0.19 – 0.60	0.302
(study_phase [Post-Treatment] * group [Blue]) * CAPS Severity	-0.46	-0.87 – -0.05	**0.028**
Random Effects			
σ^2	35.12		
$\tau_{00\ participantid}$	46.46		
ICC	0.57		
$N_{\ participantid}$	82		
Observations	160		
Marginal R^2 / Conditional R^2	0.418 / 0.749		

3.20)

PHQ Total Score Change Across Intervention by Daily Sleep Average

	PHQ Total		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	18.48	9.91 – 27.06	**<0.001**
study_phase [Post-Treatment]	-15.21	-24.46 – -5.96	**0.001**
group [Blue]	-13.78	-25.49 – -2.07	**0.021**
Average Amount of Daily Sleep	-0.02	-0.04 – 0.01	0.159
study_phase [Post-Treatment] * group [Blue]	20.73	7.88 – 33.58	**0.002**
study_phase [Post-Treatment] * Average Amount of Daily Sleep	0.03	0.01 – 0.06	**0.021**
group [Blue] * Average Amount of Daily Sleep	0.05	0.01 – 0.08	**0.009**
(study_phase [Post-Treatment] * group [Blue]) * Average Amount of Daily Sleep	-0.06	-0.10 – -0.02	**0.002**
Random Effects			
σ^2	12.42		
$\tau_{00\ participantid}$	20.99		
ICC	0.63		
$N_{\ participantid}$	82		
Observations	155		
Marginal R^2 / Conditional R^2	0.150 / 0.684		

3.22)

BAI Total Score Change Across Intervention by Trauma Exposure Type

	BAI Total		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	17.71	13.87 – 21.55	**<0.001**
study_phase [Post-Treatment]	-7.20	-10.57 – -3.84	**<0.001**
group [Blue]	3.90	-1.28 – 9.07	0.140
Trauma Exposure Type [Indirect Exposure]	8.17	-0.31 – 16.64	0.059
study_phase [Post-Treatment] * group [Blue]	-0.44	-4.94 – 4.06	0.849
study_phase [Post-Treatment] * Trauma Exposure Type [Indirect Exposure]	-1.42	-8.69 – 5.85	0.702
group [Blue] * Trauma Exposure Type [Indirect Exposure]	-18.17	-31.40 – -4.94	**0.007**
(study_phase [Post-Treatment] * group [Blue]) * Trauma Exposure Type [Indirect Exposure]	12.46	1.14 – 23.78	**0.031**
Random Effects			
σ^2	43.20		
$\tau_{00\ participantid}$	75.64		
ICC	0.64		
$N_{\ participantid}$	82		
Observations	161		
Marginal R^2 / Conditional R^2	0.142 / 0.688		

3.23)

STAI Total Score Change Across Intervention by CAPS Symptoms

		stai total	
Predictors	*Estimates*	*CI*	*p*
(Intercept)	81.17	63.76 – 98.57	**<0.001**
study_phase [Post-Treatment]	-19.44	-36.38 – -2.51	**0.024**
group [Blue]	-15.82	-43.73 – 12.08	0.266
CAPS Symptoms	0.91	-0.40 – 2.22	0.175
study_phase [Post-Treatment] * group [Blue]	30.52	4.28 – 56.75	**0.023**
study_phase [Post-Treatment] * CAPS Symptoms	1.74	0.30 – 3.19	**0.018**
group [Blue] * CAPS Symptoms	1.49	-0.59 – 3.56	0.161
(study_phase [Post-Treatment] * group [Blue]) * CAPS Symptoms	-2.64	-4.73 – -0.54	**0.014**
SD (Intercept)	13.54		
SD (Observations)	3.28		
Random Effects			
σ^2	115.19		
$\tau_{00\ participantid}$	183.32		
ICC	0.61		
$N_{\ participantid}$	82		
Observations	158		
Marginal R^2 / Conditional R^2	0.213 / 0.696		

3.42)

STAI State Anxiety Total Score Change Across Intervention by Left Insula Fear Recall Activation

	stai state anxiety		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	39.37	35.04 – 43.69	**<0.001**
study_phase [Post-Treatment]	-3.36	-7.09 – 0.37	0.078
group [Blue]	-0.67	-6.85 – 5.50	0.831
Left Insula Activation	-0.48	-8.22 – 7.26	0.903
study_phase [Post-Treatment] * group [Blue]	1.99	-3.31 – 7.28	0.462
study_phase [Post-Treatment] * Left Insula Activation	-5.51	-12.11 – 1.09	0.102
group [Blue] * Left Insula Activation	-7.82	-18.80 – 3.16	0.163
(study_phase [Post-Treatment] * group [Blue]) * Left Insula Activation	11.05	1.68 – 20.41	**0.021**
SD (Intercept)	7.69		
SD (Observations)	2.41		
Random Effects			
σ^2	33.75		
$\tau_{00\ participantid}$	59.14		
ICC	0.64		
$N_{\ participantid}$	49		
Observations	97		
Marginal R^2 / Conditional R^2	0.121 / 0.681		

3.43)

STAI Trait Total Score Change Across Intervention by Connectivity Between Primary Visual Cortex and Posterior Superior Temporal Gyrus

	STAI Trait Total		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	53.02	49.55 – 56.50	**<0.001**
study_phase [Post-Treatment]	-7.03	-9.68 – -4.38	**<0.001**
group [Blue]	2.35	-2.56 – 7.27	0.349
Primary Visual Cortex to pSTG Connectivity	4.74	-4.27 – 13.75	0.302
study_phase [Post-Treatment] * group [Blue]	3.01	-0.94 – 6.96	0.136
study_phase [Post-Treatment] * Primary Visual Cortex to pSTG Connectivity	-2.07	-15.45 – 11.31	0.762
group [Blue] * Primary Visual Cortex to pSTG Connectivity	6.76	-6.86 – 20.37	0.331
(study_phase [Post-Treatment] * group [Blue]) * Primary Visual Cortex to pSTG Connectivity	-18.23	-37.33 – 0.88	0.062
SD (Intercept)	8.84		
SD (Observations)	2.30		
Random Effects			
σ^2	28.11		
$\tau_{00\ participantid}$	78.19		
ICC	0.74		
$N_{\ participantid}$	71		
Observations	137		
Marginal R^2 / Conditional R^2	0.117 / 0.766		

3.44)

STAI Total Score Change Across Intervention by Connectivity Between Supramarginal Gyrus and Inferior Frontal Gyrus

		STAI Total	
Predictors	*Estimates*	*CI*	*p*
(Intercept)	93.89	87.03 – 100.74	**<0.001**
study_phase [Post-Treatment]	-5.20	-12.78 – 2.38	0.179
group [Blue]	12.53	0.51 – 24.55	**0.041**
Supramarginal Gyrus to Inferior Frontal Gyrus Connectivity	-4.52	-24.73 – 15.69	0.661
study_phase [Post-Treatment] * group [Blue]	-10.96	-22.31 – 0.39	0.058
study_phase [Post-Treatment] * Supramarginal Gyrus to Inferior Frontal Gyrus Connectivity	-15.77	-39.59 – 8.04	0.194
group [Blue] * Supramarginal Gyrus to Inferior Frontal Gyrus Connectivity	-25.13	-55.49 – 5.24	0.105
(study_phase [Post-Treatment] * group [Blue]) * Supramarginal Gyrus to Inferior Frontal Gyrus Connectivity	42.26	10.93 – 73.58	**0.008**
SD (Intercept)	15.02		
SD (Observations)	3.21		
Random Effects			
σ^2	105.82		
$\tau_{00\ participantid}$	225.49		
ICC	0.68		
$N_{\ participantid}$	71		
Observations	137		
Marginal R^2 / Conditional R^2	0.115 / 0.717		

3.45)

BAI Total Score Change Across Intervention by Connectivity Between Supramarginal Gyrus and Medial Prefrontal Cortex

		BAI Total	
Predictors	*Estimates*	*CI*	*p*
(Intercept)	19.44	14.94 – 23.95	**<0.001**
study_phase [Post-Treatment]	-8.91	-12.81 – -5.01	**<0.001**
group [Blue]	1.13	-4.63 – 6.89	0.700
Supramarginal Gyrus to Medial Prefrontal Cortex Connectivity	4.21	-9.50 – 17.91	0.548
study_phase [Post-Treatment] * group [Blue]	3.62	-1.51 – 8.75	0.167
study_phase [Post-Treatment] * Supramarginal Gyrus to Medial Prefrontal Cortex Connectivity	-13.15	-27.69 – 1.39	0.076
group [Blue] * Supramarginal Gyrus to Medial Prefrontal Cortex Connectivity	-6.53	-23.34 – 10.28	0.446
(study_phase [Post-Treatment] * group [Blue]) * Supramarginal Gyrus to Medial Prefrontal Cortex Connectivity	23.00	4.00 – 41.99	**0.018**
SD (Intercept)	8.79		
SD (Observations)	2.49		
Random Effects			
σ^2	38.72		
$\tau_{00\ participantid}$	77.26		
ICC	0.67		
$N_{\ participantid}$	71		
Observations	139		
Marginal R^2 / Conditional R^2	0.124 / 0.708		

3.51)

BDI Total Score Change Across Intervention by Activation in vMPFC During Fear Conditioning Activation

	BDI Total		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	20.82	17.52 – 24.12	**<0.001**
study_phase.x [Post-Treatment]	-10.07	-13.43 – -6.72	**<0.001**
group [Blue]	0.18	-5.50 – 5.86	0.951
vMPFC Fear Conditioning Activation	-10.67	-16.19 – -5.15	**<0.001**
study_phase.x [Post-Treatment] * group [Blue]	3.52	-2.16 – 9.21	0.224
study_phase.x [Post-Treatment] * vMPFC Fear Conditioning Activation	6.18	0.65 – 11.70	**0.028**
group [Blue] * vMPFC Fear Conditioning Activation	20.35	12.20 – 28.51	**<0.001**
(study_phase.x [Post-Treatment] * group [Blue]) * vMPFC Fear Conditioning Activation	-12.09	-20.22 – -3.96	**0.004**
Random Effects			
σ^2	36.39		
$\tau_{00\ participantid}$	37.50		
ICC	0.51		
$N_{\ participantid}$	49		
Observations	96		
Marginal R^2 / Conditional R^2	0.416 / 0.713		

Appendix D. Preliminary Findings and Abstracts

This appendix provides a comprehensive account of all preliminary analyses conducted throughout the duration of the study. Unpublished preliminary analyses and findings were conducted in Years 1-3, and reported below in chronological order, beginning in Year1. Following Year 3, findings are reported chronologically as published abstracts presented at national conferences including Military Health Systems Research Symposium, SLEEP, and International Neuropsychological Association.

1. Year 1 Unpublished Preliminary Findings

Preliminary analyses in Year 1 summarized data collected from the first two completed participants. Two participants completed all aspects of the study, including the baseline neuroimaging, conditioning, polysomnographic sleep testing, and psychological evaluation, 6-weeks of treatment with the blue or amber device, and post-treatment assessment. The sample size is currently too small for meaningful statistical analysis, so we present preliminary descriptions of data to demonstrate feasibility of current study-related procedures.

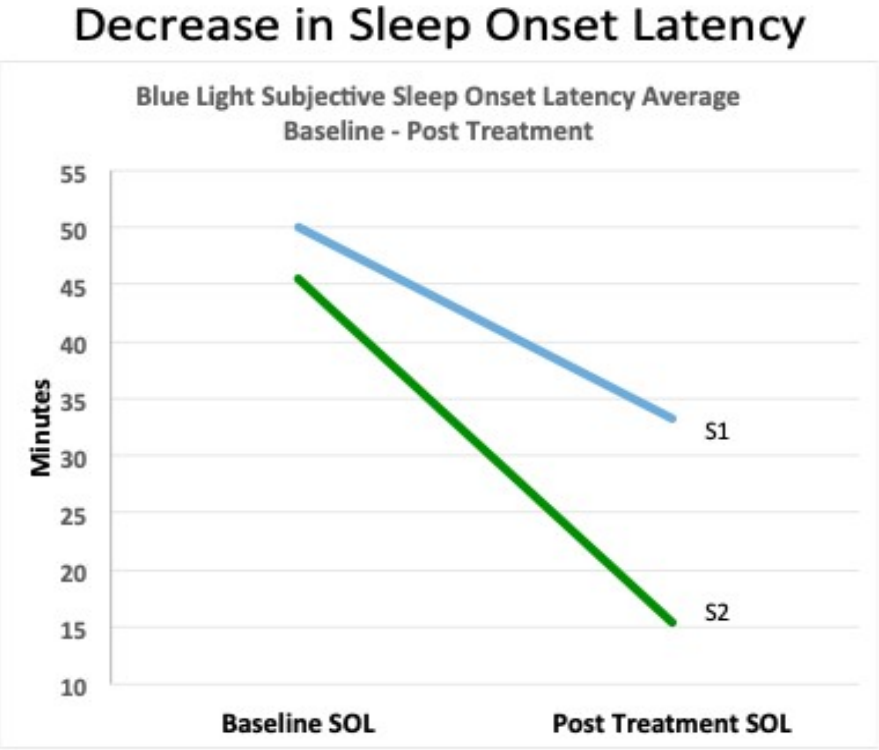

Figure 1. Decrease in sleep onset latency for the first two subjects to complete all aspects of the study. Subjective sleep onset latency was measured from the online sleep diaries completed daily by enrolled participants.

Sleep Diaries: A key component of the project involves daily monitoring of sleep. Part of this is accomplished via an online sleep diary that participants are required to complete daily. Thus far, both participants have complied with this daily log. As evidence, Figure 1 shows a graph of the mean self-reported sleep onset of these two participants between the baseline and post-treatment sessions. Overall, both participants showed a decline in the time taken to fall asleep (as measured in minutes). Given the double-blind nature of the current study, we are unable to report on whether these initial two participants were enrolled in the active BLT or amber PLT condition.

Actigraphic Monitoring: Sleep is also being monitored by actigraphy. We are using the Actiwatch Spectrum Pro device, which allows collection of sleep and activity levels, as well as light exposure in three wavelengths. As shown in Figure 2 below, we are able to examine overall sleep and light values at any timepoint during the study, in this case the figure compares sleep during the baseline week versus the

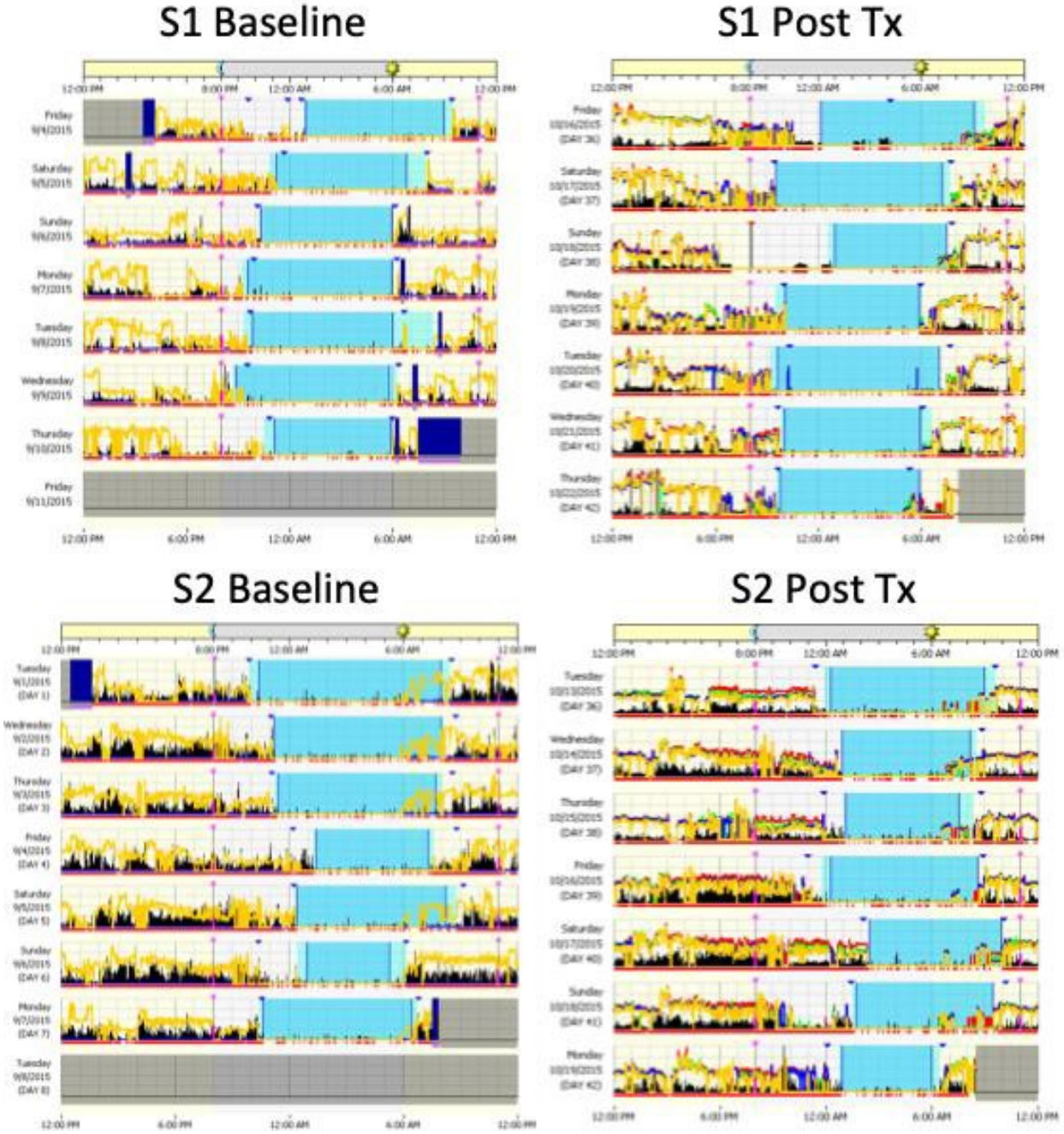

Figure 2. Actigraphy data for the first two subjects at baseline and post-treatment.

Functional MRI: The present study utilizes a multimodal neuroimaging approaches, including task-based functional magnetic resonance imaging (fMRI). Functional MRI data are collected during a "negative anticipation" task whereby the participant waits for a potentially aversive stimulus to appear on the screen. The scan measures the response within the insular cortex during the anticipation period. As shown in Figure 3, this participant showed reduction in insular activation at post treatment (post-tx), as compared to baseline (pre-Tx).

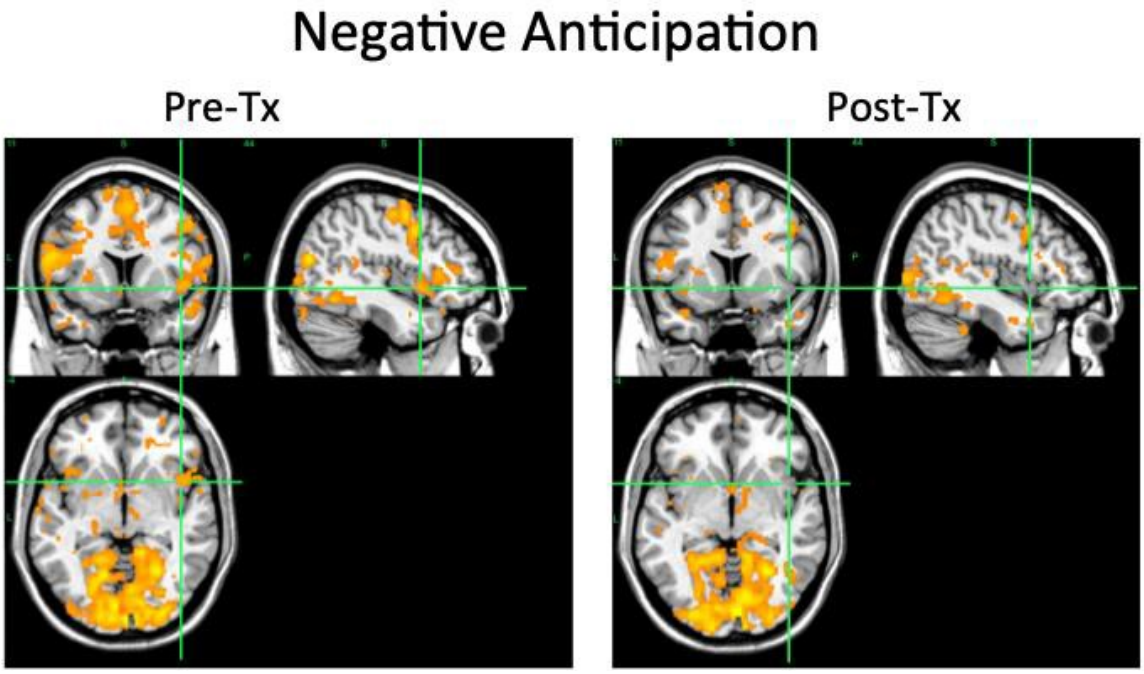

Figure 3. Functional magnetic resonance imaging (fMRI) data from n=1. This participant showed a decrease in insular activation at post-treatment (post-tx), compared to baseline (pre-tx).

2. Year 2 Unpublished Preliminary Findings

As more participants enrolled in the study and the sample increased toward the end of Year 2, our team conducted more proof-of-concept and preliminary analyses. For completeness, the unpublished findings from Year 2 are reported below.

Role of Sleep/Insomnia: Prior research strongly suggests that sleep plays an important role in PTSD. While our sample remained too small to demonstrate whether there are differences between the treatment groups in sleep issues, we present preliminary correlational data showing that residualized change in insomnia symptoms as measured by the Insomnia Severity Index (ISI) from pre- to post-treatment for the two groups combined is directly associated with reduction in residualized PTSD severity as measured by the Clinician Rated PTSD Scale (CAPS). Figure 4 shows the association between insomnia and PTSD severity for 18 participants. This preliminary finding supports our basic proposition that sleep is likely a major player in recovery from PTSD—as insomnia symptoms decline, so do PTSD symptoms. However, until we have a larger sample, it will be impossible to make causal inferences.

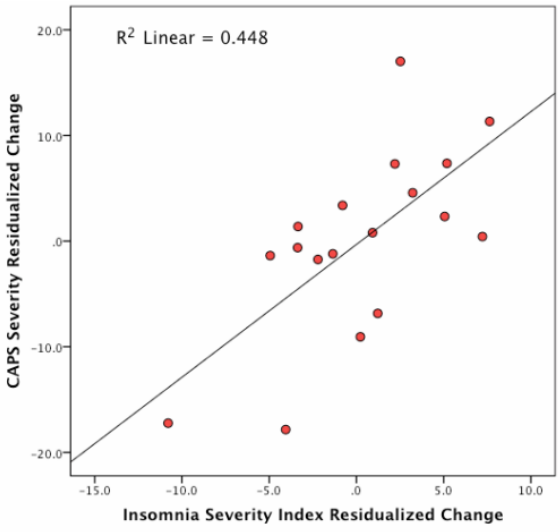

Figure 4. Residualized changes in ISI were associated with residualized changes in PTSD severity.

Functional MRI: It is well known that PTSD is associated with emotional arousal when anticipating potentially threatening or aversive situations. In the present "anticipation task", the participant waits for a potentially aversive stimulus to appear on the screen. As shown in Figure 5, participants viewed images showing a gray colored screen with an arrow pointing either left or right. During this control task, participants were instructed to simply press the button (left or right) to indicate the direction to which the arrow was pointing. Participants were told that when the screen color changed from gray to yellow an aversive picture would soon appear, but when the screen changed from gray to blue, a pleasant picture would appear. Functional MRI images were obtained during the various phases of this task. In this case, we were most interested in the "anticipation" phase as the participant awaited the appearance of an unpleasant image. While it is currently too early in the course of the study to comprehensively analyze the data, we have conducted ongoing quality assurance checks on the data and here we provide a

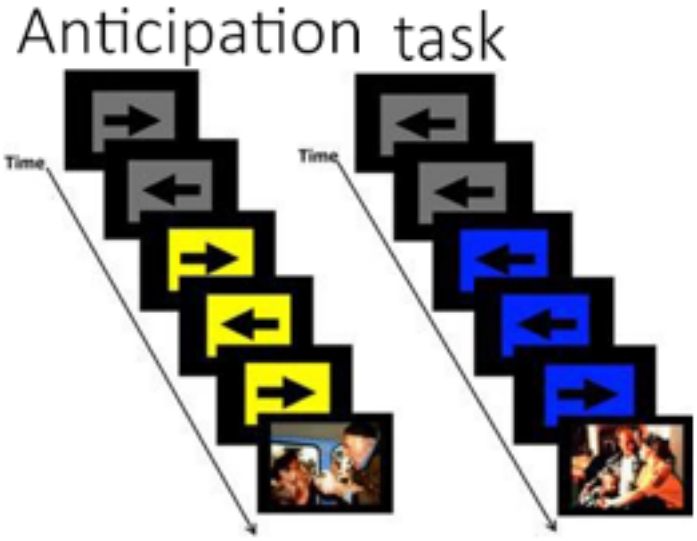

Figure 5. Example stimuli for the Anticipation Task. This is one task-based fMRI experiment completed by participants in the scanner.

preliminary analysis of the active BLT versus amber PLT conditions for the negative anticipation fMRI task. Specifically, we compared the Negative Anticipation > Positive Anticipation conditions within each individual and then conducted a paired t-test of these activation maps from pre-to post-treatment for the blue and the amber groups separately. Given the small sample sizes for the data analyzed thus far (active BLT n = 9, amber PLT n = 5), these findings are presented at an uncorrected level of significance ($p < .05$) and are not intended to reflect reliable results. Rather, we present these preliminary data merely as proof-of- concept for the types of analyses that will be conducted when samples enlarge.

As shown in Figure 6, six weeks of blue light treatment (n = 9) showed evidence of an effect of reducing brain activation responses within the amygdala and insular cortex (regions involved in interoceptive visceral sensations and anxiety responses) in response to negative anticipation relative to the amber placebo group (n = 5). Moreover, blue light was also associated with increased activation of the dorsomedial prefrontal cortex (dmPFC) and ventromedial prefrontal cortex (vmPFC), regions involved in emotion regulation. Together, these findings raise the possibility that blue light enhances prefrontal regulatory control over visceral anxiety regions of the brain that are associated with physiological responses to anticipation of negative events. Again, we emphasize that these findings are extremely preliminary and in no way represent reliable findings due to the small sample sizes.

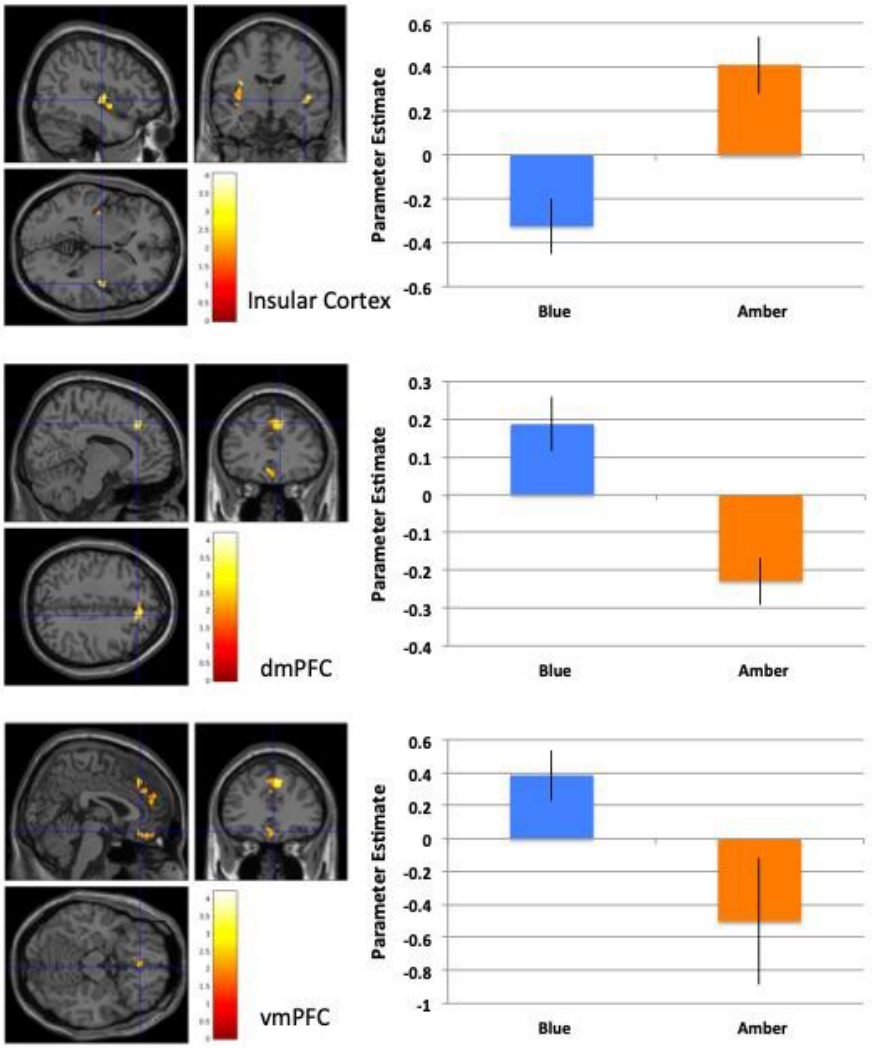

Figure 6. Participants in the blue light group (n=9) showed reduced activation in the amygdala and insular cortex during the anticipation task.

3. Year 3 Unpublished Preliminary Findings

In Year 3, we continued to assess data quality collected from enrolled participants. By Year 3, data from 29 participants was collected, quality control checked, and preprocessed for preliminary analyses. Below is a summary of preliminary analyses and findings that are not otherwise published or presented.

Baseline Group Comparisons—Demographics: Data from 29 participants (n = 15 for BLT, and n = 14 for amber PLT) was analyzed. As shown in Figure 7, the treatment groups did not differ significantly on demographic variables including age and sex. The sex ratio of males to females was similar for the two treatment conditions (χ^2=.03, p = .84). Active BLT and amber PLT groups did not differ significantly in age (t(30)=.29, p = .77) (Mean age Blue = 31.23, SD = 8.90; Mean age Amber = 30.33, SD = 8.25)(see Figure 7).

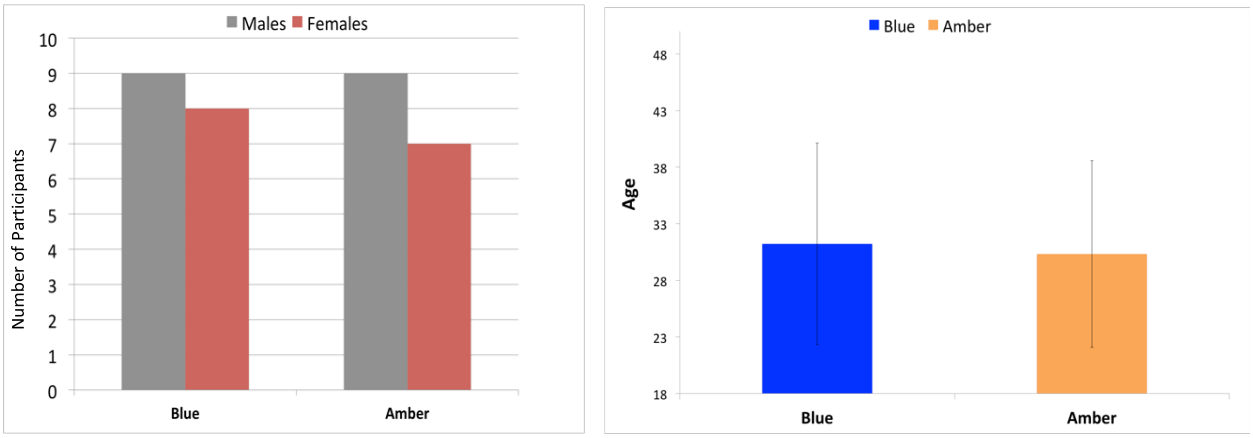

Figure 7. Demographic variables do not differ between blue and amber groups at baseline.

Baseline Group Comparisons—PTSD Severity: To determine whether the groups were comparable in terms of PTSD symptoms at baseline, simple mean comparisons were made between groups with regard to severity and symptom frequency. The two groups did not differ in scores on the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5). As evident in Figure 8, they reported similar number of PTSD symptoms (t(31)=-1.01, p = .32) and similar PTSD severity (t(31)=-1.32, p=.19). *This preliminary finding suggests that, at present, there is no concern that the two groups differ in their initial severity or symptom frequency.*

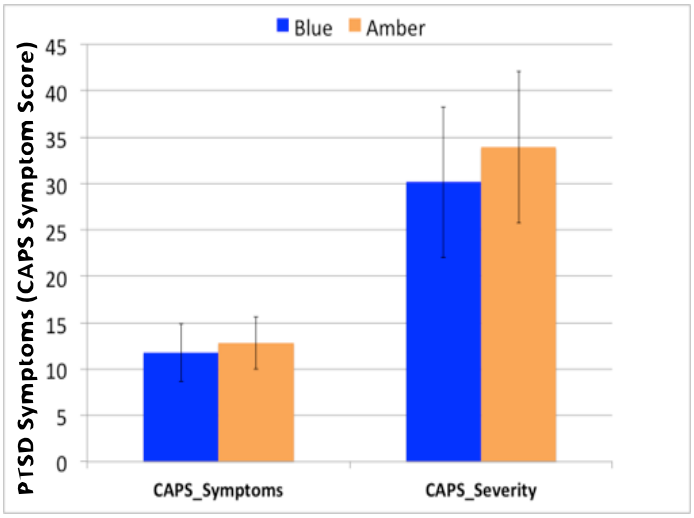

Figure 8. Comparison of CAPS scores at baseline between blue and amber groups.

PTSD Severity Group Differences After Light Treatment: One of the major goals of this study is to use blue light therapy (BLT) to reduce symptom severity among individuals with PTSD. Here, we conducted a group x time repeated measures ANOVA. As shown in Figure 9, there was a significant reduction in the number of PTSD symptoms for both groups ($F(1, 27) = 53.97$, $p < .001$). Moreover, the group x time interaction approached significance ($F(1,27) = 3.74$, $p = .06$). As can be seen in Figure 9, individuals in the BLT group showed a much steeper decrease in the number of PTSD symptoms from pre- to post-treatment relative to those in the amber/placebo condition. *Given the limited power at this point in the study, this finding is highly encouraging that blue light treatment may provide a useful method for reducing the number of PTSD symptoms.*

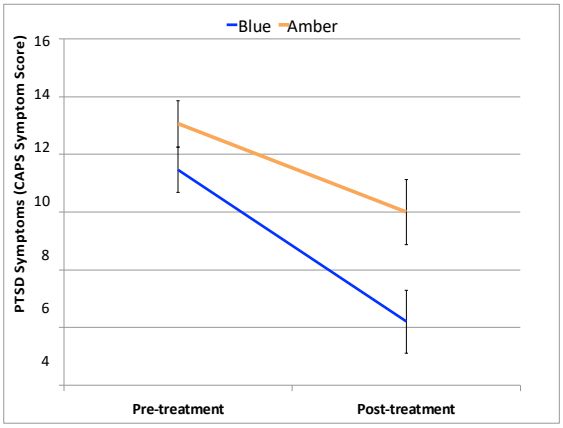

Figure 9. Light group x time interaction was marginally significant (p = .06), suggesting greater reduction in symptoms for the blue compared to the amber group.

In terms of PTSD severity, there was a significant reduction in PTSD severity for both groups ($F(1, 27) = 54.87$, $p < .001$). While there was no significant group x time interaction ($F(1,27) = 2.20$ $p = .15$), Figure 10 shows that individuals in the blue light group also showed a steeper reduction in PTSD symptoms than individuals in the amber light group (76% versus 55%). However, changes in PTSD severity from pre- to post-treatment were not significantly different between participants in the BLT and PLT. At present, the sample sizes are relatively small and underpowered, but we are encouraged that the blue light treatment appears to be showing a steeper reduction in symptom severity at this early phase of the study.

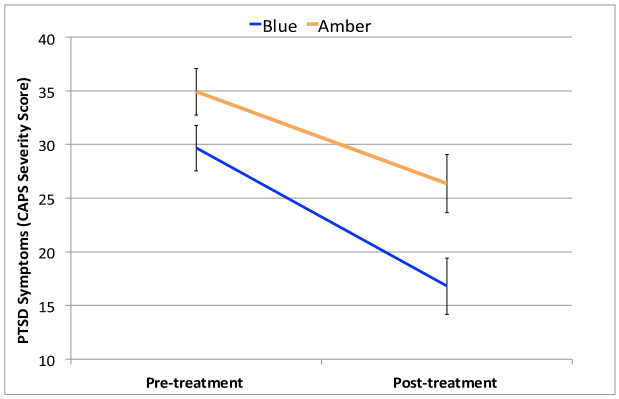

Figure 10. Light group x time interaction was not significant, suggesting no significant change in symptom severity for the blue compared to the amber group.

Sleep Quality After Light Treatment: There were no differences between the two groups in self-reported sleep quality on the Pittsburgh Sleep Quality Index (PSQI) at pre-treatment ($t(29) = -1.30$, $p = .20$). Overall the change in sleep quality from pre- to- post-treatment approached a trend level of significance ($F(1, 26) = 3.18$, $p = .08$). There was no significant group x time interaction $F(1, 26) = 2.34$, $p = .13$). However, as can be seen in Figure 11, individuals in the amber light group seemed to have reported no change in sleep quality, whereas individuals in the blue light group reported fewer symptoms of disrupted sleep (fewer symptoms on the PSQI indicate better sleep quality). With greater power as the sample size is increased, we hypothesize that this finding will emerge as statistically significant.

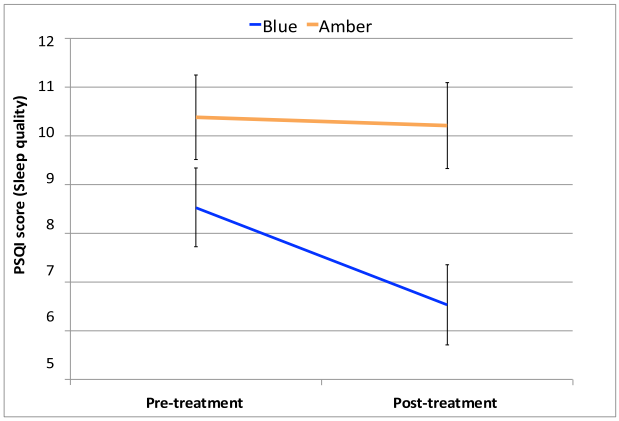

Figure 11. There is no effect of amber light on sleep quality, whereas blue shows a trend toward reduced sleep complaints after treatment.

Functional Magnetic Resonance Imaging: In our anticipation task, participants are told they will see arrows on a grey background. The participant is given a response box and instructed to press a button (left or right) to indicate the direction in which the arrow was pointing. They are told that the screen will sometimes change color- if the screen turns yellow, a negative picture will soon appear. If the screen turns green, a positive picture will soon appear. If the screen turns blue, a positive or negative picture will soon appear. fMRI images are taken through the duration of the task.

We hypothesized that the participants that had received six weeks of daily blue light exposure would show improved emotion regulation during the task when compared to the participants that had undergone six weeks of daily amber light exposure. We compared the Negative Anticipation > Positive Anticipation conditions within individuals and then conducted a paired t-test of these activation maps from pre- to post- treatment for the blue and the amber groups separately. Fifteen adults (mean age = 30 years, +/- 8.75; 53% female) with a clinical diagnosis of PTSD took part in this study. Individuals in the blue versus amber group showed increases in the right medial prefrontal cortex and decreases in the left insula from pre- to post light treatment when anticipating negative versus positive stimuli ($p<.005$, uncorrected). While there was no group x time interaction ($F(1,13)=.34$, $p=.56$), paired samples t-test showed a significant decrease in symptoms for blue ($t(9)=8.25, p<.001$) and not for amber ($t(4)=1.84$, $p=.18$).

These preliminary results suggest that daily blue light exposure may alter responses in brain regions linked to emotion regulation and may improve symptoms of PTSD. However, this analysis was underpowered to detect significantly significant differences in PTSD severity and functional brain responses between the two groups from pre- to post- treatment. Follow up analyses with a significantly larger sample size will be conducted once data collection for this study is complete.

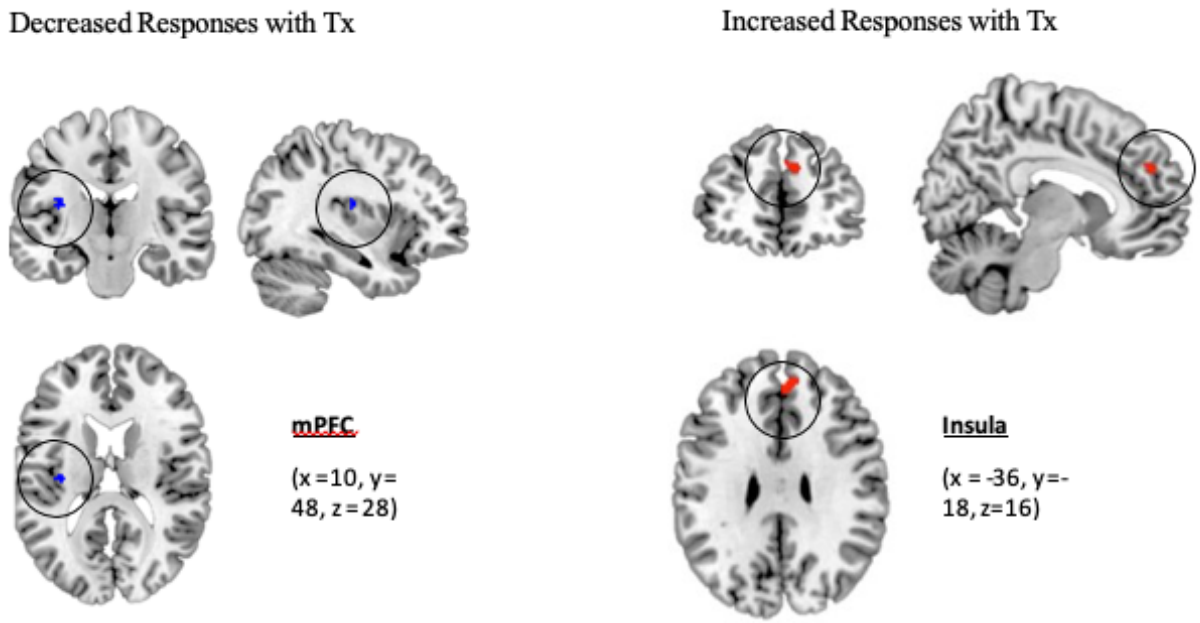

Figure 12. Responses to the Anticipation Task show significant declines in the insular cortex and increased activation in the medial prefrontal cortex following blue light treatment.

Depression and PTSD: The high prevalence of PTSD and depression comorbidity is well established, with comorbidity rates often reported between 30 and 50%. Both PTSD and depression are understood to have debilitating long-term cognitive effects, though the majority of research analyzes these disorders independent of one another. Anticipation of aversive stimuli is often associated with an intense emotional response in individuals with PTSD, however, little research has been done on whether higher depression scores exacerbate that response. In a preliminary analysis we looked at how participants' scores on the Beck Depression Inventory affected their reaction to the aforementioned anticipation task in the MRI scanner. Sixteen eligible adults (7 females, mean age = 29.4 years) completed the emotional anticipation task during functional magnetic resonance imaging. Images from the negative > positive anticipation contrast were regressed against BDI-II scores using Statistical Parametric Mapping (SPM12) for analysis.

In our sample of individuals with PTSD, higher depression scores were associated with reduced activation within the lateral orbitofrontal cortex during anticipation of negative events. Because of the important role of the lateral orbitofrontal cortex (OFC) in behavioral inhibition and emotional regulation, these findings suggest that higher levels of depressive symptoms in individuals with PTSD might exacerbate dysfunctional regulation of emotional responses during anticipation of negative events.

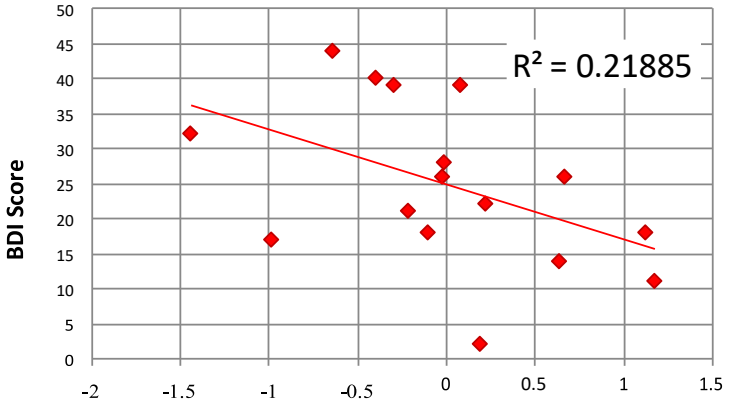

Figure 13. Higher brain activation within the orbitofrontal cortex during the anticipation task was associated with lower BDI scores.

Resiliency and PTSD: A preliminary analysis of our collected data suggests that among participants with PTSD, greater psychological resilience is associated with reduced responsiveness within regions involved in memory retrieval and insight into the future during the emotional anticipation task explained above. Eighteen adults (10 males, Mean age = 30.1) completed the emotional anticipation task during functional magnetic resonance imaging. Participants also completed the Connor-David Resilience Scale (CD-RISC), a 25-item questionnaire that measures coping over the past month. After controlling for PTSD severity with the Clinician-Administered PTSD Scale (CAPS), participants who reported higher resiliency were found to have significantly less activation in the left lateral temporal cortex (242 voxels, $p<0.001$, FDR-corrected) and the right frontal pole (91 voxels, $p=0.024$, FDR- corrected). Furthermore, our team found a significant correlation between the eigenvariate values for the lateral temporal cortex cluster and CD-RISC scores ($R^2 = 0.404$).

4. Published Preliminary Findings

Throughout the duration of the study, preliminary findings were published through the submission and presentation of numerous abstracts. The following section list published abstracts in full, further detailing preliminary analyses and results. Abstracts are listed in chronological order, beginning with the earliest published abstract and ending with the most recent.

Daily morning blue light exposure leads to changes in functional brain responses during emotional anticipation in individuals with PTSD

Anna Alkozei, Ryan Smith, Andrew Fridman, Alyssa Dormer, Skye Challener, Michael A. Grandner, & William D.S. Killgore

Background

Some of the most common symptoms of post-traumatic stress disorder (PTSD) are sleep difficulties. Morning blue light exposure (BLE) has been used as a way to improve sleep and advance the circadian rhythm. The present study assessed whether six weeks of daily morning BLE can reduce PTSD symptom severity as a result of improved sleep, and affect functional brain responses when anticipating aversive emotional stimuli.

Methods

Fourteen healthy adults (50% female) with a clinical diagnosis of PTSD (according to the Structured Clinical Interview for DSM-5) were randomly assigned to receive either six weeks of morning BLE (active condition, n=9) or amber light (placebo condition, n=5) for 30 minutes each day. Before and after the intervention, participants completed the Clinician Administered PTSD Scale for DSM-5 (CAPS-5) and underwent functional magnetic resonance imaging (fMRI) at 3T while completing an emotional anticipation task. Neuroimaging data were preprocessed and analyzed with SPM12 using standard algorithms. Standard regions of interest (ROIs) were placed bilaterally at the insula, amygdala, and medial prefrontal cortex.

Results

While there was no difference in CAPS-5 symptom scores from pre- to post-light exposure between the two groups ($F(1,12)=.09$, $p=.78$), participants in the BLE group showed a significant increase in activation within the right medial frontal gyrus (22 voxels) and a decrease in activation within the right insula (10 voxels) when anticipating negative versus positive stimuli ($p=.005$, uncorrected).

Conclusion

While we found no evidence for a reduction in PTSD symptoms due to daily morning BLE, these preliminary results suggest that daily BLE may alter responses in brain regions linked to emotion regulation. However, this was a preliminary study and future work with larger sample sizes will examine the possibility that these neuronal changes correspond to individuals' behavioral responses when having to regulate emotions, as well as improved PTSD symptoms and sleep quality.

Neural responses to emotional stimuli in individuals with PTSD after daily morning blue light exposure

Anna Alkozei, Ryan Smith, Andrew Fridman, Alyssa Dormer, Skye Challener, & William D.S. Killgore

Background

Two of the most prevalent symptoms in post-traumatic stress disorder (PTSD) are emotion regulation difficulties as well as sleep problems. Morning blue light exposure (BLE) has been used as a way to improve sleep, and acute BLE has been shown to modulate brain activation changes during anticipation of emotional stimuli in healthy individuals. This study assessed whether six weeks of daily morning BLE can reduce PTSD symptom severity and lead to changes in individuals' functional brain responses when anticipating aversive emotional stimuli.

Methods

Fourteen individuals (50% female) with a clinical diagnosis of PTSD were randomly assigned to receive either six weeks of 30 minutes of morning BLE (active condition, n=9) or amber light (placebo condition, n=5). Before and after the intervention, participants completed the Clinician Administered PTSD Scale for DSM-5 (CAPS-5) and underwent fMRI while completing an emotional anticipation task.

Results

While there was no difference in CAPS-5 symptom scores from pre- to post-light exposure between the two groups ($F(1,12)=.09$, $p=.78$), participants in the BLE group showed an increase in activation within the right medial frontal gyrus and a decrease in activation within the right insula when anticipating negative versus positive stimuli ($p=.005$, uncorrected).

Conclusion

The results suggest that daily BLE may alter responses in brain regions linked to emotion regulation. As we found no differences in PTSD symptoms between the two groups, it is unclear whether these neuronal changes correspond to changes in cognitive or behavioral emotion regulation abilities. Future research with larger sample sizes should therefore examine this intriguing possibility.

The Role of Trait Gratitude on Functional Brain Activation Changes When Anticipating Negative Events in Individuals With PTSD

Anna Alkozei, Ryan Smith, Andrew Fridman, Alyssa Dormer, Skye Challener, & William D.S. Killgore

Background

While higher levels of trait gratitude have been associated with reduced posttraumatic stress disorder (PTSD) symptom severity and improved emotion regulation abilities, the neurobiological basis of this association is unknown. We aimed to investigate how differences in trait gratitude were associated with functional brain activation changes in individuals with PTSD when anticipating negative stimuli.

Methods

Fifteen individuals (53% female) with a clinical diagnosis of PTSD completed an emotional anticipation task during fMRI. Participants also completed the Gratitude Questionnaire (GQ6). Whole brain analyses were conducted for the negative anticipation>uncertain anticipation contrast using a height intensity threshold of $p<.001$ while protecting against Type I error through a cluster-corrected extent threshold of 62 (FDR correction of $p<.05$).

Results

There was a significant negative association between GQ6 scores and activation within the right insula ($x=34$, $y=16$, $z=10$; $p=.03$), bilateral rACC ($x=-4$, $y=36$, $z=4$; $p<.001$), and the left precuneus ($x=-12$, $y=-66$, $z=32$; $p=.02$). There was also a significant positive association between rACC-insula functional connectivity and GQ6 scores during negative anticipation ($T=2.66$, $p=.04$).

Conclusion

In a sample of patients with PTSD, those with higher gratitude show evidence of reduced hyperactivation within the insua and greater connectivity of the rACC with the insula when anticipating negative stimuli, a finding that may suggest better automatic emotion regulation abilities. As previous studies have shown that rACC activation has been linked to better emotion regulation, and trait gratitude can be enhanced via gratitude interventions, the use of such approaches as part of current evidence-based treatments may be beneficial for individuals with PTSD.

Resiliency Is Associated with Reduced Activation within the Retrosplenial Cortex and Secondary Motor Area for Individuals with PTSD During Anticipation of a Negative Event

Andrew J. Fridman, Anna Alkozei, Ryan Smith, Skye Challener, Sara A. Knight, & William D.S. Killgore

Background
Individuals with post-traumatic stress disorder (PTSD) often engage in avoidance behaviors to minimize the pain of emotionally reliving the distressing experience. The retrosplenial cortex (RSC), strongly linked to episodic memory retrieval, and the supplemental motor area (SMA), responsible for internally driven action selection, may be implicated as important neurobiological components of this coping mechanism. We hypothesized that among participants with PTSD, greater psychological resilience would be associated with reduced responsiveness within regions relevant to self-relevant processing during a task involving anticipation of a negative image.

Methods
Eighteen participants (10 males, mean age=30.1), who met DSM-V criteria for PTSD, were administered an anticipation task during functional magnetic resonance imaging (fMRI) and then completed the Connor-David Resilience Scale (CD-RISC). After controlling for symptom severity (i.e., Clinician-Administered PTSD Scale), we conducted a whole-brain regression analysis within Statistical Parametric Mapping (SPM12) to investigate the association between activation (anticipating negative images versus baseline involving no anticipation) and CD-RISC scores.

Results
Participants who reported higher resiliency were found to have significantly less activation in the RSC (236 voxels, $p<0.001$, FDR corrected), SMA (144 voxels, $p=0.005$, FDR corrected), and medial somatosensory cortex (209 voxels, $p=0.001$, FDR corrected) during the anticipation of negative images.

Conclusions
More resilient individuals with PTSD engaged their RSC and SMA less when anticipating negative events, suggesting a potential neurobiological substrate of resilience in this population. These findings may have important implications for developing targeted interventions that focus on reappraising negative stimuli, rather than utilizing avoidance techniques.

Higher Depressive Symptoms are Associated with Lower Activation in the Orbital Frontal Cortex When Anticipating Negative Stimuli in Individuals with PTSD

Skye Challener, Anna Alkozei, Andrew Fridman, Alyssa Dormer, & William D.S. Killgore

Objective

The high prevalence of post-traumatic stress disorder (PTSD) and depression comorbidity is well established, with comorbidity rates often reported between 30 and 50%. Both PTSD and depression have debilitating long-term cognitive effects, though the majority of research analyzes these disorders independently from one another. Anticipation of aversive stimuli is often associated with an intense emotional response in individuals with PTSD, however, little research has been done on whether higher depression scores exacerbate that response. We hypothesized that higher depression would be associated with reduced prefrontal activation during anticipation of aversive visual stimuli among patients with PTSD.

Participants and Methods

Sixteen adults (7 females, mean age = 29.4 years) meeting criteria for DSM-5 post- traumatic stress disorder (PTSD) completed an emotional anticipation task during functional magnetic resonance imaging (fMRI). Participants also rated depressive symptoms on the Beck Depression Inventory (BDI-II). Images from the negative > positive anticipation condition were regressed against BDI-II scores using SPM12.

Results

When anticipating negative visual stimuli, BDI-II scores correlated negatively with activation within the left orbitofrontal cortex (OFC) [x=-28, y=62, z=-2] $k = 88$; $p < 0.005$ uncorrected].

Conclusions

Among individuals with PTSD, higher depression scores were associated with reduced activation within the OFC during anticipation of negative events. These findings suggest that high levels of depressive symptoms in individuals with PTSD might exacerbate dysfunctional regulation of emotional responses during anticipation of negative events. Future research should explore whether successful treatment of depression normalizes OFC function and potential correlations with symptom presentation.

Sleep Problems are Associated with Greater Default Mode Network Activation When Anticipating Negative Stimuli in Individuals with PTSD

Skye Challener, Anna Alkozei, Angela Yung, Meltem Ozcan, Adam C. Raikes & William D.S. Killgore

Background

Sleep difficulties represent some of the most common complaints of individuals with post-traumatic stress disorder (PTSD). Sleep problems can affect daytime alertness and can lead to many functional impairments. The extent to which these impairments are associated with altered brain functioning in PTSD is not currently known. Here, we correlated daily sleep related impairments with functional brain responses when anticipating an aversive visual image.

Participants and Methods

Thirty-one adults (14 male; 17 female, mean age=30.6) meeting diagnostic criteria for PTSD underwent functional magnetic resonance imaging while completing an emotional anticipation task. Participants were given cues to anticipate either a positive or negative visual image that subsequently appeared on the screen. They also rated the impact of excessive sleepiness on daily activities and quality of life using the Functional Outcomes of Sleep Questionnaire (FOSQ).

Results

During anticipation of negative stimuli (in contrast to no anticipation), greater FOSQ sleep impairments correlated positively with activation within the medial prefrontal cortex [x=-4, y=40, z=-12]; k=317; p=<0.001, FWE cluster-corrected] and the posterior cingulate/retrosplenial cortex [x=-8, y=-46, z=38]; k= 82; p< 0.001, FWE cluster- corrected], two key midline structures of the default mode network (DMN).

Conclusions

Among patients with PTSD, greater sleepiness-related impairments were associated with increased activation of the medial DMN when anticipating negative but not positive visual stimuli. Because the DMN is activated during self-referential processing, this suggests that excessive sleepiness and sleep-related impairments may exacerbate the tendency to associate negative cognitions with self-processing. Addressing sleep problems may be important for recovery in PTSD.

Daytime sleepiness in individuals with PTSD is associated with greater activation in the right angular gyrus when viewing negative images

Meltem Ozcan[1], Skye Challener[1], Angela Yung[1], Anna Alkozei[1], Adam C. Raikes[1], William D.S. Killgore[1]

[1]Social, Cognitive, and Affective Neuroscience Lab, Department of Psychiatry, University of Arizona

Background

Post-traumatic stress disorder (PTSD) is often associated with poor sleep quality that can result in increased daytime sleepiness. However, it is unknown how increased daytime sleepiness may affect functional brain responses during emotion processing. We hypothesized that greater daytime sleepiness in individuals with PTSD would lead to increased hypervigilant brain activation responses within the attentional system when viewing negative versus positive images during functional magnetic resonance imaging (fMRI).

Methods

Thirty-one individuals clinically diagnosed with PTSD (N_{female}=17; M_{age}=30.66, SD_{age}=8.39) completed the Epworth Sleepiness Scale (ESS), a measure of daytime sleepiness, as well as an emotional anticipation task during fMRI. The task included exposure to highly pleasant and unpleasant images from the International Affective Picture System.

Results

For unpleasant versus pleasant images, whole brain analyses showed a significant positive association between ESS scores and activation within a cluster spanning the middle occipital lobe and the right angular gyrus (x=46, y=-64, z=26; k=125, p=.005, FWE-cluster corrected).

Conclusions

Greater daytime sleepiness was associated with greater activation in the right occipital-parietal cortex when viewing negative versus positive images. Considering the role of the angular gyrus and inferior parietal regions in shifting attention to salient stimuli, our findings suggest that daytime sleepiness may reduce cognitive control, leading to increased attention toward negative stimuli. Behaviorally, this may be reflected in a greater negative attentional bias, contributing to the maintenance of PTSD. Interventions focused on improving sleep quality may prove useful for minimizing the tendency toward negative attentional biases in individuals with PTSD.

Improvements in PTSD Symptom Severity are Associated with Greater Activation in the Hippocampus During Anticipation of Negative Stimuli

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Background

Post-Traumatic Stress Disorder (PTSD) is often associated with distorted emotional contextualization of memories, leading to re-experiencing symptoms and flashbacks in novel situations. The hippocampus is integrally involved in both memory and emotional regulation. Individuals with PTSD often have reduced hippocampal activity during memory-related tasks. Here, we investigated whether time-dependent improvement in PTSD symptom severity correlated with changes in hippocampal activity during an emotional anticipation task.

Methods

Twenty-eight individuals with PTSD (Female=13, mean age=31±8.2) were randomized to receive blue (n=14) or placebo amber (n=14) light therapy (30-mins/morning for 6 weeks). The Clinician-Administered PTSD Scale (CAPS) and an emotional anticipation task during fMRI were administered at pre- and post-treatment visits. Changes in functional brain activation when anticipating negative stimuli in contrast to a no-anticipation baseline condition were analyzed. We correlated these functional activation changes with post-treatment CAPS score changes.

Results

CAPS scores improved between visits (mean change pre-post=-4.1±2.97), however, there were no significant differences between the blue and amber groups. Whole brain analyses showed that lower post-treatment CAPS scores were associated with increased hippocampal activity during negative anticipation ($x=-34$, $y=-32$, $z=-18$, $k=39$, $p<.005$, uncorrected).

Conclusions

Previous studies demonstrate that individuals with PTSD often have reduced hippocampal activation during memory tasks, with corresponding deficits in context-relevant emotional responses. Our preliminary results suggest improvement in PTSD symptom severity over time may lead to increased hippocampal activation when anticipating negative stimuli. This change in hippocampal activation may be important for encoding new contextual information about negative stimuli that may have previously triggered re-experiencing symptoms.

Functional Impairment Due to Excessive Daytime Sleepiness is Associated with Greater Activation in the Default Mode Network When Anticipating Negative Stimuli in Individuals with PTSD

Skye Challener, Anna Alkozei, Angela Yung, Meltem Ozcan, Adam C. Raikes & William D.S. Killgore

Background

Individuals with post-traumatic stress disorder (PTSD) commonly report sleep difficulties. Sleep disturbance is known to have far-reaching negative effects on emotion regulation, a critical factor in the maintenance of PTSD. Additionally, sleep disturbance has significant negative effects on the performance of activities of daily living (ADLs). However, the relationship between the effects of excessive daytime sleepiness and functional brain responses during emotion processing remains unexplored. In this study, we investigated functional brain activation during an emotional anticipation task and correlated this activation with ADL impairment due to excessive daytime sleepiness.

Participants and Methods

Thirty-one adults (17 female, mean age=30.56) clinically diagnosed with PTSD completed an emotional anticipation task during a functional magnetic resonance imaging session. Participants also rated the impact of excessive sleepiness on ADLs and sleep- related quality of life (QoL) using the Functional Outcomes of Sleep Questionnaire (FOSQ).

Results

When anticipating negative stimuli (in contrast to no anticipation), there was a positive correlation between FOSQ scores (greater FOSQ scores indicate worse ADL performance and QoL) and activation within two regions comprising the default mode network (DMN), notably, the medial prefrontal cortex [x=-4, y=40, z=-12]; k=317; p=<0.001, FWE cluster-corrected] and the posterior cingulate/retrosplenial cortex [x=-8, y=-46, z=38]; k= 82; p< 0.001, FWE cluster-corrected]. There was no association between FOSQ scores and activation when anticipating positive stimuli.

Conclusions

The results showed greater activation within areas of the DMN when anticipating negative stimuli was associated with poorer ADL performance and sleep-related quality of life due to excessive sleepiness in individuals with PTSD. Interestingly, this association was not found when individuals were anticipating positive images. These findings may therefore suggest that excessive sleepiness and the associated impairment in daily functioning could exacerbate avoidance behaviors or dissociative states in individuals with PTSD when anticipating negative events.

The Association Between Monrningness-Eveningness and Nightmares in PTSD

Anna I. Burns, K. Caleigh Shepard, Meltem Ozcan, Anna Alkozei, John R. Vanuk, & William D.S. Killgore

Objective

Individuals with a morningness preference (MP) prefer earlier wake and bedtimes in comparison to those with an eveningness preference (EP), who prefer later wake and bedtimes. Previous work has found that an EP is associated with a greater frequency of nightmares. Individuals with post-traumatic stress disorder (PTSD) are more likely to have an EP, as well as experience a greater frequency of nightmares. Daily morning blue light therapy (BLT) has been used to treat sleep disorders and phase advance circadian rhythms, leading to earlier wake-up times and is being explored as a treatment for PTSD. It is not known whether BLT could improve frequency and severity of nightmares for individuals with PTSD. Here we examined whether trait differences in morningness- eveningness were associated with changes in nightmare frequency following six-weeks of BLT vs a placebo light therapy.

Participants and Methods

Fifty-four individuals (53.7% female, Mean age =30.66, SD =8.15) with a clinical diagnosis of PTSD were administered the Morningness-Eveningness Questionnaire (MEQ) to assess self-reported preference of time of wake and sleep. Participants also completed the Disturbing Dreams and Nightmare Severity Index (DDNSI) as a measure of nightmare severity and frequency.

Results

The associations between MEQ and DDNSI did not differ between BLT (r = -.331, p=.180) and placebo light condition (r = -.481, p =.027), with the sample as a whole showing a significant negative association between morningness-eveningness and change in nightmare severity (r = -.410, p =.010).

Conclusion

A greater MP was associated with a decrease in nightmare severity while greater EP was associated with an increase in nightmare severity, regardless of light treatment. Since light treatment was administered regularly in the morning, the morning structure may be more beneficial to those whom already have a MP, but may be disruptive for those with an EP. Further research is needed to fully understand the impact of EP on nightmares for PTSD.

The Association Between PTSD Severity and Life Satisfaction is Mediated by Trait Gratitude

Anna Burns, Meltem Ozcan, K. Caleigh Shepard, Anna Alkozei, & William D.S. Killgore

Objective

Higher levels of trait gratitude (i.e. the ability to identify and appreciate positive aspects in one's life) have been associated with increased satisfaction with life (SWL) and lower levels of psychopathology. Even in individuals with post-traumatic stress disorder (PTSD), higher trait gratitude has been shown to predict lower PTSD symptom severity over time. However, it is not known whether gratitude can explain the relationship between PTSD symptom severity and SWL in this clinical population. We hypothesized that trait gratitude would mediate the relationship between PTSD symptom severity and SWL in individuals with PTSD.

Participants and Methods

Fifty-two individuals (53.7% female, Mean age =30.66, SD =8.15) with a clinical diagnosis of PTSD were administered the Clinician-Administered PTSD Scale for DSM-5 as a measure of PTSD symptom severity. Participants also completed the Gratitude Questionnaire-6 as a measure of trait gratitude and the Satisfaction With Life Scale as a measure of their satisfaction with life as a whole. A mediation analysis using Hayes' PROCESS tool in SPSS was conducted to explore the hypothesis that trait gratitude would mediate the relationship between PTSD symptom severity and SWL.

Results

As expected, trait gratitude partially mediated the negative relationship between PTSD symptom severity and SWL (b=-.32, 95% CI[-.69,-.08]).

Conclusion

The relationship between PTSD symptom severity and SWL can, in part, be explained by an individual's level of trait gratitude. These findings may be explained by the impact of trait gratitude on one's cognitive style, including the ability to positively reframe negative situations, and its influence on self-reported self-esteem, both of which are often negatively impacted by traumatic experiences. These findings suggest a potential utility for gratitude training interventions as an adjunctive treatment approach for PTSD.

Trait gratitude and the impact of excessive daytime sleepiness on daily functioning predict PTSD severity over time

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Background

Individuals with post-traumatic stress disorder (PTSD) also often report symptoms of anxiety, depression, and poor sleep quality. It has been suggested that higher emotional resilience, better sleep quality, and higher trait gratitude may be protective factors for PTSD severity. Here, we explored several of these potential protective factors of PTSD severity over time.

Methods

Forty-six individuals (52% female, *M*age=31.57, *SD*=8.91) with a clinical diagnosis of PTSD were administered the Clinician-Administered PTSD Scale for DSM-5 (CAPS) to determine PTSD symptom severity at time 1 (T1) and after six weeks of light therapy (time 2; [T2]). Participants completed the Gratitude Questionnaire (GQ-6), the Functional Outcomes of Sleep Questionnaire (FOSQ), the Connor-Davidson Resilience Scale (CD-RISC), the Beck Anxiety Inventory (BAI) and the Beck Depression Inventory (BDI-II) at T1 and T2. A hierarchical regression to was run using SPSS with CAPS severity at time 2 as the outcome variable. CAPS severity at time 1 was entered in the first step, and GQ6, FOSQ, CD-RISC, BAI, BDI-II scores at time 1, and age and gender were entered as the second step in a stepwise fashion.

Results

Overall, participants showed a decrease in PTSD severity over time (T1 *M*=33.02, *SD*=8.65; T2 *M*=22.77, *SD*=12.59). For the group as a whole, CAPS severity at T1 was a significant predictor of CAPS severity at T2, explaining 63% of the variance (R^2=.631, p< .001). The inclusion of FOSQ and GQ6 scores at T1 explained an additional 4% of the variance in CAPS scores at T2 (R^2= .719, p< .001).

Conclusions

Individuals with PTSD who experienced fewer disruptions to their daily life activities due to excessive daytime sleepiness, and who felt more gratitude at the start of the light exposure treatment were more likely to exhibit lower PTSD severity over time. As such, interventions targeting PTSD severity would benefit from integrating exercises aimed at improving sleep quality to lower excessive daytime sleepiness and increasing gratitude.

Differences in Anxiety Reduction between Minority and Majority Racial Groups Participating in Morning Blue Light Exposure

K. Caleigh Shepard[1], Meltem Ozcan[1], Anna I. Burns[1], Anna Alkozei[1], John R. Vanuk, William D.S. Killgore[1]

Background

Those who identify as White/Caucasian are more likely to be diagnosed with an anxiety fisorder than those who identify as a minority racial grou. Increased anxiety is a common symptom for those with post-traumatic stress disorder (PTSD). Blue light therapy (BLT) has been used as a treatment for depression and sleep disorders, however, the effect of BLT on anxiety levels for individuals with PTSD has yet to be investigated. We examined the effect of BLT on anxiety symptoms between minority and majority racial groups in a sample of individuals with PTSD.

Participants and Methods

Forty-four men and women (52.2% female, Mean age=31.0) with a clinical diagnosis of PTSD were randomized to 6 weeks of 30 minutes of morning BLT (n=22), or placebo amber light (n=22). Thirty of these participants identified as the culturally dominant racial group of White/Caucasian (68.1%, mean age= 31.6), while the remaining 14 participants identified as a minority racial group (Hispanic/Latino, African American/Black, Native American/American Indian, or Other). Pre- and post-light therapy, participants completed the Beck Anxiety Inventory (BAI) as a measure of anxiety symptoms.

Results

A repeated-measures ANOVA showed a significant main effect of time, such that all individuals decreased in their anxiety level ($F(1,39)=38.86$, $p=.001$), as well as a significant time x race interaction, such that that those in the minority racial group reported a significantly greater reduction in anxiety levels than those in the majority racial group ($F(1,39)=10.15$, $p=.003$).

Conclusions

After using either the blue light or amber light for a period of six weeks, both the minority and majority racial groups reported significant decreases in anxiety severity. However, racial minorities were found to have significantly larger reductions in anxiety symptoms, when compared to those in the majority racial group. Further research is needed to fully understand the increased effect the treatment has on anxiety levels within racial minorities.

Racial Differences Regarding the Effectiveness of Blue Light Therapy in Reducing PTSD Severity

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Objective

Daily blue light therapy (BLT) has been used as a treatment for certain mood and sleep disorders. It has not yet been investigated if BLT would also be effective for post-traumatic stress disorder (PTSD) and whether its effectiveness may differ across racial groups. Here, we examined potential differences in the effectiveness of BLT for reducing PTSD severity between majority and minority racial groups.

Participants and Methods

Forty-four men and women (52.2% female, Mean age=31.0, SD=8.45) with a clinical diagnosis of PTSD were randomized to 6 weeks of 30 minutes of morning BLT (n=23), or placebo amber light (n=21). Thirty participants identified as the culturally dominant racial group of White/Caucasian while the remaining 14 participants identified as a minority racial group (Hispanic/Latino, African American/Black, Native American/American Indian, or Other). Pre- and post-light therapy, participants completed the Clinician-Administered PTSD Scale for DSM- 5 as a measure of PTSD severity.

Results

A repeated-measures ANOVA showed a significant decrease in PTSD severity over time, regardless of race or light condition ($F(1,39)=61.58$, $p=.001$). However, there was a group x time x race interaction, such that BLT was found to be more effective at reducing PTSD severity for those in the racial majority than the minority group ($F(1,39)=5.14$, $p=.029$).

Conclusions

While daily light therapy was effective at reducing PTSD symptoms across racial groups, BLT was more effective at reducing PTSD severity for those who identified as White/Caucasian, while the amber light condition was more effective at reducing PTSD severity within the racial minority category. The results highlight that race is an important factor to consider when evaluating light therapy effectiveness, and that further analyses regarding the effect of amber light therapy as a treatment for PTSD should be examined.

The Association Between PTSD Severity and Insomnia is Mediated by Nightmares

Anna Burns, Meltem Ozcan, K. Caleigh Shepard, Kyle LaFollette, Anna Alkozei, Michael A. Grandner, & William D.S. Killgore

Objective

Individuals with Post-Traumatic Stress Disorder (PTSD) are likely to experience nightmares and disturbed sleep. In fact, sleep disruption is often the most frequently reported symptom of PTSD. This population often re-experiences their traumatic events through nightmares. If left untreated, sleep disturbance can become a chronic issue and tends to be associated with poor recovery. Of the various sleep-related issues, nightmares can lead to a greater number of nocturnal awakenings and establish a conditioned fear response to sleep that further impacts emotional functioning. Here we examined whether nightmare severity mediates the relationship between PTSD severity and insomnia.

Participants and Methods

Fifty-eight adults (59.3% female, Mean age = 31.1 years, SD = 8.5) with a clinical diagnosis of PTSD were administered the Clinician-Administered PTSD Scale for DSM- 5 as a measure of symptom severity. Individuals completed the Disturbing Dreams and Nightmare Severity Index (DDNSI) as a measure of nightmare severity and frequency and the Insomnia Severity Index (ISI) to assess participants' degree of insomnia. A mediation analysis using Hayes' PROCESS tool in SPSS was conducted to test the hypothesis that nightmare severity would mediate the relationship between PTSD severity and insomnia.

Results

Consistent with prior research, there was a significant positive relationship between PTSD severity and insomnia (b = .20). Moreover, nightmare severity fully mediated the positive relationship between PTSD severity and insomnia (b = .39, 95% CI [.10, .68]), F (2,55) = 6.77, p =. 0024.

Conclusion

As expected, the severity of PTSD symptoms was significantly correlated with insomnia symptoms. However, the relationship between PTSD severity and insomnia appears to be fully mediated by the severity of nightmares. In other words, greater severity of PTSD appears to lead to more severe nightmares, which in turn, lead to greater problems with insomnia. These findings suggest that interventions aimed toward reducing nightmare severity may be particularly efficacious in the treatment of PTSD.

Gratitude and Frequency of Naps Predict Resilience for Individuals with PTSD

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Objective

Resilience, the ability to bounce back from adversity, has been found to be a protective factor against the development of Post-Traumatic Disorder (PTSD). Positive emotions such as gratitude (i.e. the ability to appreciate positive aspects of one's life) can promote the development of critical resilience capacities. Moreover, sleep may play a role in resilience. For instance, napping can facilitate the retention of fear extinction memories. We hypothesized that both gratitude and weekly napping frequency would predict self-reported resilience in patients with PTSD.

Participants and Methods

Twenty-seven individuals who had reported habitually napping (63% female, Mean age=31.7 years, SD =9.0) with a clinical diagnosis of PTSD were administered the Gratitude Questionnaire-6 as a measure of trait gratitude, and also reported how many times they nap per week. These were used to predict scores on the Connor-Davidson Resilience Scale, a self-report measure of resilience.

Results

Multiple linear regression was used to predict resilience from gratitude and frequency of napping (for those who take naps during the week). Each variable was entered in a separate step. Individually, gratitude significantly predicted resilience (β=.594, p=0.002), R^2=.35. However, when added to the model, the frequency of weekly napping significantly increased prediction (R^2 Change=.135). In the final model, both gratitude (β=.403, p=0.029) and napping (β=.414, p=0.025) significantly predicted resilience (R^2=.487).

Conclusion

Of those who indicate being habitual nappers, it was found that increased gratitude, combined with greater frequency of naps taken per week, predicted higher resilience levels than gratitude alone. These findings may be explained by the combination of higher trait gratitude, which would allow one to be able to reframe a negative situation positively, and the increased frequency of naps taken by individuals, promoting the retention of fear extinction. This combination appears to promote resilience. Combining naps with gratitude training interventions may prove useful in building resilience among patients recovering from PTSD.

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Morning Blue Light Exposure Improves Sleep and Fear Extinction Recall in PTSD

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Background

Sleep disruption is considered to be the "hallmark symptom" of post-traumatic stress disorder (PTSD). In addition to sleep deficits, patients with PTSD who undergo experimental fear conditioning also typically show a deficit in the ability to recall extinction memories relative to those without the disorder. As memory consolidation is strongly influenced by sleep, we hypothesized that an intervention that regulates sleep and circadian rhythms (i.e., morning exposure to blue-wavelength light) might enhance consolidation and retention of learned extinction memory during a fear conditioning/extinction protocol among patients with PTSD.

Methods

Thirty-eight individuals with PTSD (18 male; Age=30.8, SD=9.0) underwent a well- validated fear conditioning and extinction protocol and were then randomly assigned to receive either BLUE (469 nm; n=20) or placebo AMBER (578 nm; n=18) morning light therapy for 30- minutes daily for 6-weeks. Participants returned after 6 weeks to undergo post-treatment extinction recall when exposed to the same previously conditioned stimuli. Extinction recall magnitude (ERM) at follow-up was calculated as the difference in skin conductance response (SCR) between the "extinguished" and the "never-extinguished" stimuli.

Results

BLUE light was associated with an increase in sleep duration relative to AMBER ($p=.016$). Based on the ERM, participants in the BLUE group showed sustained retention of extinction memory, while those in the placebo AMBER group showed a resurgence of the fear response after 6-weeks ($p=.016$). Moreover, retention of ERM was correlated with improvement in sleep on the Insomnia Severity Index for the BLUE ($r=.44$, $p<.05$) but not the AMBER group ($r=-.09$, ns).

Conclusions

Compared to placebo, 6-weeks of daily morning BLUE-wavelength light exposure was associated with increased sleep duration and greater retention of extinction learning in patients with PTSD. We speculate that increased sleep quantity or quality during the intervening weeks after learning led to greater consolidation of the fear extinction memory. Prominent exposure treatments for PTSD are based on principles of fear extinction, and our findings suggest that blue light treatment may facilitate treatment gains by stabilizing sleep in a manner that promotes consolidation of extinction memory.

Support: USAMRMC (W81XWH-14-1-0570).

Individuals with PTSD whose traumatic experiences occurred within the home have worse sleep outcomes

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Introduction

For most people, the concept of "home" is associated with feelings of safety, privacy, and control. However, this may not be the case for individuals who have been traumatized in their home. We hypothesized that among individuals with PTSD, mentioning words related to "home" in trauma narratives would be associated with worse sleep outcomes.

Methods

Sixty-three individuals (38 Females; *Mage* = 31.60, *SDage*=8.91) with a clinical diagnosis of PTSD were administered the Functional Outcomes of Sleep Questionnaire (FOSQ), Insomnia Severity Scale (ISI), and Clinician-Administered PTSD Scale for the DSM-5 (CAPS), and provided brief descriptions of traumatic events they experienced in their lifetimes. FOSQ is a measure of functional problems experienced due to sleepiness, with higher scores denoting better sleep outcomes. Linguistic Inquiry and Word Count (LIWC) 2015, a computerized text analysis tool, was used to quantify the percentage of references to "home" within each participant's narrative.

Results

Out of the sixty-three participants, 28 participants referred to "home" several times in their narratives (*M*=3.94, *SD*=3.30). These individuals had significantly higher ISI scores (*M*=17.29, *SD*=5.18 *t*(62)=2.01, $p<.05$) and significantly lower FOSQ scores (*M*=13.22, *SD*=3.44, *t*(61)=- 2.80, $p<.01$) compared to individuals who did not have "home" references (ISI: *M*=14.61, *SD*=5.37; FOSQ: *M*=15.45, *SD*=2.88).There was no significant difference in CAPS scores between the two groups. Controlling for PTSD severity, ISI and FOSQ scores were significantly negatively correlated for individuals who had "home" references in their narratives ($r=-.56$, $p<.01$). ISI and FOSQ scores were not correlated for the remaining participants. The strength of association between the two groups was significantly different ($z=-2.61$, $p<.01$).

Conclusions

These findings suggest that individuals with PTSD who experienced traumatic events in the context of their homes have significantly worse sleep outcomes and their insomnia problems are associated with more difficulty performing day-to-day activities. It is possible that individuals who experienced traumatic events at home may have difficulty falling and staying asleep due to increased hypervigilance while at home. Interventions aimed at helping such individuals reclaim their homes as safe havens might be worthwhile for improving sleep outcomes.

PTSD Severity and Use of Negative Emotion Words in Trauma Narratives Predict Nightmares in Individuals with PTSD

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Introduction

Recurring, distressing nightmares are commonly experienced by individuals with PTSD. Previous research shows that higher use of positive than negative emotion words while describing traumatic experiences is associated with better health outcomes. We hypothesized that greater use of negative words in trauma narratives, along with higher PTSD severity, would predict the severity and frequency of nightmares in individuals with PTSD.

Methods

Sixty-three individuals (38 Females; M_{age} = 31.60, SD_{age}=8.91) with a clinical diagnosis of PTSD were administered the Disturbing Dream and Nightmare Scale (DDNSI) and Clinician- Administered PTSD Scale for the DSM-5 (CAPS). Participants also typed a brief description of the most traumatic event they had experienced. These trauma narratives were processed with Linguistic Inquiry and Word Count (LIWC) 2015 to categorize positive and negative emotion words used in the descriptions. LIWC is a highly reliable and widely used computerized text analysis system that categorizes text into psychologically valuable (e.g. emotional state) and stylistic dimensions. Multiple linear regression analyses were run using SPSS.

Results

Participants used more negative than positive emotion words when describing their traumatic event ($M_{positive}$=0.55, SD=1.41; $M_{negative}$=10.11, SD=13.48). PTSD severity was a significant predictor of nightmares (β=0.49, F=17.61, p<.001), with an overall model fit of R^2=.24. When use of negative emotion words was entered as a second variable, both PTSD severity (β=0.45, t=3.92, p<.001) and the use of negative language in trauma narratives (β=.23, t=2.03, p<.05) were significant predictors of DDNSI, accounting for an additional 5% of the variance in the data (F=11.34, p<.001, R^2=.29).

Conclusion

These preliminary findings suggest that not only PTSD severity, but also the manner in which individuals with PTSD conceptualize and disclose their traumatic experiences might have implications for the severity and frequency with which these individuals have nightmares. The reappraisal of trauma narratives might be an important target in interventions for individuals with PTSD who experience nightmares.

The Relationships between Psychopathology and Sleep Problems Differ Between Racial Majority and Minority Groups

K. Caleigh Shepard, Meltem Ozcan, Anna I. Burns, John R. Vanuk, Michael A. Grandner, Anna Alkozei and William D.S. Killgore

Background

Individuals with PTSD often experience lower sleep quality and higher rates of insomnia in comparison to the general population. In the U.S., when controlling for socioeconomic covariates, racial minorities consistently show worse sleep quality relative to the majority group. Here, we examine how anxiety, depression, and PTSD severity correspond with sleep problems between majority and minority racial groups.

Methods

Sixty-four individuals meeting criteria for PTSD (39 female; Age=31.3, SD=9.0) completed the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) as a measure of PTSD severity, the Beck Anxiety Inventory (BAI), and the Beck Depression Inventory (BDI). Participants also completed the Pittsburgh Sleep Quality Index (PSQI), and the Insomnia Severity Index (ISI) as measures of sleep quality. Forty of these participants identified as the culturally dominant racial group of White/Caucasian while 24 participants identified as a minority (e.g. Hispanic/Latino).

Results

There were no significant differences between majority and minority racial groups on any of the measures. However, the strengths of association between PSQI and BAI scores were significantly different ($z=2.00$, $p=.045$) between majority ($r=.525$, $p < .001$) and minority groups ($r=-.066$, $p=.772$). A similar pattern was observed between the majority ($r=.455$, $p=.004$) and minority ($r=-.200$, $p=.373$) groups on CAPS scores ($z=1.98$, $p=.047$). Similarly, the association between ISI and CAPS scores was significant ($z=2.9$, $p=.003$) for individuals in the majority group ($r=.567$, $p< .001$), but not the minority group ($r=-.149$, $p=.486$). Although BDI was significantly correlated with ISI ($r=.445$, $p=.005$) and with PSQI ($r=.401$, $p=.014$) within the majority group and not the minority group, the strength of association for depression (i.e., BDI) did not differ between groups.

Conclusions

Anxiety and PTSD severity were significantly correlated with sleep problems and insomnia for those in the majority group, but not among the racial minority group. This suggests that other psychosocial factors besides psychopathology, such as discrimination or acculturative stress, should be explored to better explain adverse sleep outcomes in minority populations. Further research investigating the effect of depression on sleep quality across racial groups should be conducted.

Use of Anger Words in Trauma Narratives is Negatively Associated with Sleep Quality for Single Individuals with PTSD

K. Caleigh Shepard, Meltem Ozcan, Anna I. Burns, Michael A. Grandner, and William D.S. Killgore

Background

Irritability and sleep problems are commonly experienced by individuals with PTSD. Feelings of anger have been shown to increase cognitive agitation and psychological arousal, negatively affecting sleep quality. Prior research has shown that individuals in healthy romantic relationships report better sleep than single individuals, and there appears to be a bidirectional relationship between sleep and relationship quality. Here, we examine the relationship between sleep quality and the use of anger words (e.g., hate) in trauma narratives among individuals with PTSD who are single or in stable romantic relationships.

Methods

Forty-six individuals meeting criteria for PTSD (26 Female; M_{Age}=31.30, SD=9.00) were administered the Pittsburgh Sleep Quality Index (PSQI) and provided brief narratives of lifetime traumatic events. Linguistic Inquiry and Word Count (LIWC) 2015 was utilized to compute percentage values for anger words used in these narratives. Twenty-five participants reported that they had never been married and were currently not in a stable romantic relationship (15 Female; M_{Age}=25.80, SD=5.13), and twenty-one participants indicated that they were currently married or were in a stable romantic relationship (11 Female; M_{Age}=32.02, SD=8.14).

Results

The percentage of words relating to anger in trauma narratives was positively correlated with PSQI scores for individuals within the single group (r=.51, p=.01), but not for individuals with significant others (r=-.25, p=.33), when controlling for age. The strength of association between PSQI and percentage of anger words was significantly different (z=-2.24, p=.03) between groups. The groups did not differ significantly in the percentages of anger word use ($M_{married}$=3.33, SD=5.05, $M_{non\text{-}married}$=3.55, SD=4.34) or PSQI scores ($M_{married}$=9.74, SD=3.52, $M_{non\text{-}married}$=9.75, SD=2.69).

Conclusions

These preliminary results suggest that expressing anger in relation to traumatic events may be associated with worse sleep quality among single individuals with PTSD. Having a significant other is typically associated with emotional support and validation, possibly allowing these individuals to express anger in a healthy manner that does not impact sleep quality. Future research could benefit from clarifying the potential benefits of romantic relationships on sleep and recovery from PTSD.

The Relationship Between Sleep Onset Latency and Gratitude

Anna I. Burns, Meltem Ozcan, K. Caleigh Shepard, Anna Alkozei, John R. Vanuk, William D.S. Killgore

Objective

Post-traumatic stress disorder (PTSD) is a common diagnosis among military personnel returning from combat operations. While PTSD is associated with a number of symptoms, sleep disruption is often considered to be the "hallmark symptom" of this disorder. In fact, upward of 91% of patients with PTSD have reported sleep disturbances in some samples. Treating the sleep problems is critical, as emerging evidence suggests that improvements in sleep disruption can lead to improvements in symptoms and a faster recovery. While pharmacologic interventions can be helpful, there is a great need for non-pharmacologic or behavioral methods to improve sleep in this population. One potential non-pharmacologic approach is through the implementation of gratitude interventions. Gratitude is the recognition of the positive aspects within one's life and can be a useful tool in elevating positive affect in those with PTSD. Previous research has found that Veterans with PTSD who experience higher levels of gratitude also experience a greater satisfaction with life and better self-reported sleep quality, although research on this topic is extremely limited. To further understand the associations between gratitude and sleep disruption, we conducted a preliminary study to examine the correlations between actigraphically measured sleep and self-rated trait gratitude. We hypothesized that for those with PTSD, sleep onset latency (i.e., how long it takes to fall asleep) would correlate negatively with self-report of trait gratitude. Furthermore, as sex differences in outcomes are important to assess, we also hypothesized that the associations would differ for men and women with PTSD.

Participants and Methods

Fifty-six individuals (71.4% female; Age: M =31.8, SD =8.8) with a clinical diagnosis of PTSD based on the Structured Clinical Interview for DSM-5 were administered the Gratitude Questionnaire-6 as a measure of trait gratitude and the Clinician Administered PTSD Scale for the DSM-5 (CAPS-5) as a measure of PTSD severity. Participants wore a Phillips Respironics Actiwatch Spectrum PRO for one week collecting sleep onset latency data. PTSD severity for men (M=30.25, SD = 8.9) and women (M=34.68, SD = 7.98) was not significantly different (t (54)= -1.814, p = .075).

Results

A two-tailed Pearson's correlation showed that sleep onset latency was negatively correlated with gratitude (r = -.271, p = .043), suggesting that those with lower trait gratitude tended to take longer to fall asleep based on their actigraphic data. This relationship was further investigated separately for women and men using a two-tailed Pearson's correlation. There was a significant negative correlation between sleep onset latency and gratitude for women (r = -.477, p = .004). On the other hand, sleep onset latency and gratitude were positively correlated for men, but this relationship was not statistically significant (r = .433, p = .094). We next examined the difference between these two correlations using a Fisher's r-to-z transformation, which revealed that the relationship between sleep onset latency and gratitude was significantly different between women and men (Z = -3.05, p = .002, two-tailed).

Conclusion

As predicted, higher trait gratitude was associated with shorter sleep onset latency. This finding is consistent with previous research on gratitude and self-reported sleep quality (Wood et al., 2009), as gratitude may be able to lessen negative pre-sleep cognitions, fostering a quicker sleep onset. Moreover, there were significant gender differences in the direction of this association. Women were found to have a

significant negative relationship between sleep onset latency and gratitude, suggesting that higher gratitude is associated with shorter time to sleep onset, while men tend to show the opposite association. The reason for this difference is not entirely clear, but previous research by Kashdan et al., 2009, indicates that men may react negatively towards gratitude as they find the emotion more challenging to express than women. These findings suggest that when implementing gratitude interventions for sleep disturbance, clinicians should take gender differences into account. This is particularly important within the U.S. military where the vast majority of Service members are male. While these findings are preliminary, they raise concern over the potential utility of gratitude interventions within the military. Further research comparing the effects of gratitude interventions on sleep- related outcomes will be necessary before such interventions should be implemented in a widespread fashion throughout the military.

Blue Light Exposure Enhances Sleep and Fear Extinction Recall in PTSD

William D. S. Killgore, Meltem Ozcan, K. Caleigh Shepard, Anna I. Burns, John R. Vanuk, and Anna Alkozei

Background

Among military personnel who have deployed in support of combat operations in recent decades, the rate of post-traumatic stress disorder (PTSD) ranges from around 14-20%. Of those who are diagnosed with PTSD, sleep disorders are generally the most prevalent complaint, ranging from 70-91% across studies, leading sleep disruption to be considered as the "hallmark symptom" of the disorder. Importantly, poor sleep can exacerbate symptoms, as sleep plays a critical role in normal emotional regulation and in the consolidation of emotional memories. In addition to sleep deficits, patients with PTSD who undergo experimental fear conditioning also typically show a deficit in the ability to recall extinction memories relative to those without the disorder. This is critical to recovery, as most prominent models of therapy for PTSD are based on theories of emotional memory reconsolidation and extinction. Because memory consolidation is strongly influenced by sleep, we hypothesized that an intervention that regulates sleep and circadian rhythms might enhance consolidation and retention of learned extinction memory during a fear conditioning/extinction protocol among patients with PTSD. Blue light exposure in the morning is associated with a suppression of melatonin and a phase advance in the rhythm and timing of sleep. Therefore, in the present study, we tested the hypothesis that exposure to blue-wavelength light for 30-minutes each morning for 6-weeks would enhance sleep and the retention of fear extinction memory during a classical fear conditioning paradigm.

Methods

Thirty-eight individuals meeting DSM-5 criteria for PTSD (18 male; Age=30.8, SD=9.0) completed sleep questionnaires, including the Insomnia Severity Index (ISI) and Epworth Sleepiness Scale, and measures of PTSD symptoms, including the Clinician Administered PTSD Scale and PTSD Symptom Checklist-5. Participants then underwent a well- validated fear conditioning and extinction protocol. After the extinction training, participants were then randomly assigned to receive either BLUE (469 nm; n=20) or placebo AMBER (578 nm; n=18) morning light therapy for 30-minutes daily at home for 6-weeks. Participants returned after 6 weeks to complete the questionnaires and undergo post-treatment extinction recall when exposed to the same previously conditioned stimuli. Skin conductance response (SCR) was measured at each session in response to the stimuli. Extinction recall magnitude (ERM) at follow-up was calculated as the difference in SCR between the "extinguished" and the "never-extinguished" stimuli.

Results

Six weeks of BLUE light exposure was associated with an increase in sleep duration relative to AMBER ($p=.016$), and was associated with a significant reduction in daytime sleepiness on the ESS ($r = -.41$, $p = .03$), and a reduction in CAPS Arousal/Reactivity ($r = -.44$, $p = .018$), and a reduction in PCL5 ($r = -.64$, $p = .0002$). Based on the ERM, participants in the BLUE group showed sustained retention of extinction memory, while those in the placebo AMBER group showed a resurgence of the fear response after 6-weeks ($p=.016$). Moreover, retention of ERM was correlated with improvement in sleep on the Insomnia Severity Index for the BLUE ($r = .44$, $p < .05$) but not the AMBER group ($r = -.09$, ns).

Conclusions

Compared to placebo, 6-weeks of daily morning BLUE-wavelength light exposure was associated with increased sleep duration, reduced daytime sleepiness, and reduced symptom severity relative to AMBER placebo treatment. Further, we found that BLUE light exposure was associated with enhanced retention of fear extinction learning in patients with PTSD. We speculate that increased sleep quantity or quality during the intervening weeks after learning led to greater consolidation of the fear extinction memory. This is important, as prominent exposure treatments for PTSD are based on principles of fear extinction. Our findings suggest that blue light treatment may potentially facilitate treatment gains from such exposure therapies by stabilizing sleep in a manner that promotes consolidation of extinction memory.

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The relationship between combat and non-combat trauma and risk-taking propensity in individuals with PTSD

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Background

Service members returning from combat commonly report a variety of physical, psychological and behavioral health problems (Kazis, Miller, Clark, et al., 1998). Research shows that combat exposure experiences, especially those of a violent nature, are associated with increased propensity for risky behavior and decision-making (Killgore, Cotting, Thomas, et al., 2008). Here, we investigated the relationship between prior combat exposure, PTSD severity, and risk-taking propensity in male individuals clinically diagnosed with PTSD.

Methods

Thirteen male participants who have served in the military (Age: *M*=30.62, *SD*=4.93) and 12 male participants who have not served in the military (*M*=33.08, *SD*=9.64) completed the Combat Exposure Scale (CES), the Evaluation of Risks Scale Bubble Sheet Version (EVAR-B), and the Clinician-Administered PTSD Scale for the DSM-5 (CAPS). Independent samples t-tests compared the military and non-military participants on the measures, and Spearman's rank order correlations were run to assess the relationship between combat exposure levels, PTSD severity, and risk-taking behavior.

Results

The combat experience of the military participants was characterized by light-moderate (7.7%), moderate (30.8%), moderate-heavy (38.5%), and heavy (23.1%) exposure. The groups did not significantly differ on overall PTSD severity, but military participants (*M*=5.69, *SD*=3.07) scored significantly lower on the CAPS_Intrusions_Severity subscale compared to the non-military participants (*M*=8.58, *SD*=3.18, *p*=.03). On the EVAR, military participants (*M*=366.15, *SD*=50.43) scored significantly higher than non-military participants (*M*=299.83, *SD*=68.27, *p*=.01) in their propensity to engage in risky behavior. Specifically, military participants scored significantly higher on the EVAR American factors of Risk/Thrill Seeking (*M*=15.26, *SD*=2.51) and Need for Control (*M*=12.16, *SD*=2.16) compared to non-military participants (Risk/Thrill Seeking: *M*=11.83, *SD*=3.05, *p*=.01; Need for Control: *M*=9.85, *SD*=1.95, *p*=0.01). Spearman's rank order correlations revealed significant relationships between the experience of having been under enemy fire and CAPS_Intrusions_Severity scores (*r*s=.621, *p*=.02). The experience of having been surrounded by the enemy was positively associated with CAPS_Cognitions_Severity scores (*r*s=.597, *p*=.03). Spearman's rank order correlations indicated no specific association between combat exposure levels and risk-taking behavior or PTSD severity.

Conclusions

Our findings indicate that individuals who have had combat experiences (e.g., taking enemy fire) may engage in more risky behaviors than individuals who have experienced other forms of trauma (e.g. being in a car accident). The elevations in the Risk/Thrill Seeking and Need for Control factors indicate that the higher risk propensity of military individuals in our sample might be driven by an increased sense of invincibility and impulsivity having lived through combat. Furthermore, our findings suggest that the type of combat exposure, such as being surrounded by the enemy or taking fire in a combat situation, may be more closely linked with increases in PTSD symptoms rather than the severity of combat exposure. Overall, our findings suggest that combat experiences might affect risk taking behavior and attitudes differently than non-combat trauma. Programs aimed at improving the well-being of veterans might benefit from incorporating targeted preventative interventions for risky behaviors such as alcohol and

substance abuse. The present findings are preliminary and the sample size is still quite small. Thus, future research should investigate the mechanisms by which certain violent combat experiences might increase service members' risk of experiencing intrusive memories and/or negative alterations in cognition using a larger sample.

Blue Light Therapy Differences in Sleep Quality Improvement in Military and Civilian Populations

K. Caleigh Shepard, Meltem Ozcan, Anna I. Burns, Anna Alkozei, and William D.S. Killgore

Background

Poor sleep quality is a hallmark symptom of Post-Traumatic Stress Disorder (PTSD). In a recent self-report survey, United States Veterans indicated insomnia as the most common and most severe symptom of PTSD they experience. Poor sleep quality is additionally linked to higher severity of other PTSD symptoms.[1] It is, therefore, of critical importance to find ways to reduce sleep disruption in this population, which in turn, may lead to improvements in symptom presentation. One potential method for improving sleep is to regulate the daily circadian rhythm through timed exposure to light. Recent evidence suggests that there are retinal ganglion cells that are specifically attuned to respond to the blue wavelengths of light. Interestingly, these cells project directly to the surprachiasmatic nucleus of the hypothalamus and play a key role in regulating the circadian rhythm of sleep and wake. Recently, daily morning blue light therapy (BLT) has been used as a treatment for certain sleep disorders through the entrainment and regulation of circadian rhythms. Here, we investigated if BLT would be similarly effective in improving sleep quality among both Veterans and civilians suffering from sleep disturbance due to PTSD.

Methods

Fifty-eight individuals meeting DSM-5 criteria for PTSD (24 male; 34 female; Age=31.6, SD=8.9) completed a six-week course of experimental light exposure therapy. Participants were randomly assigned a light condition, either the active treatment of BLT, or a placebo treatment of amber light. Participants completed the Pittsburgh Sleep Quality Index (PSQI) as a measure of sleep quality, both at pre- and post-treatment. Twelve male participants identified as military Veterans, while the remaining forty-six participants (12 male; 34 female) identified as civilians. We compared outcomes on the PSQI between the blue and amber conditions at each time point for military and civilian groups using a mixed analysis of variance (ANOVA).

Results

Sleep quality scores on the PSQI were not statistically different between military and civilian groups at baseline or at post-treatment. However, a mixed ANOVA indicated a light group x military status x time interaction, in which only the BLT condition improved sleep quality for the military group, but both BLT and the placebo amber light group improved sleep quality for civilians ($F(1,49)=5.42$, $p=.024$) after controlling for the influence of subject sex.

Conclusions

Civilians showed a significant improvement in sleep quality over time, regardless of light exposure condition. However, among Veterans, only BLT improved sleep quality, whereas placebo was essentially ineffective at altering sleep quality. These findings suggest that there are differences between Veteran and civilian populations in their response to treatment, which are most likely accounted for by different trauma types. Further research with an increased Veteran sample size and a focus on the potential role of military versus civilian trauma experiences in sleep disruption will likely help delineate the mechanisms underlying these differences in response to light.

1. Robert N. McLay, Warren P. Klam, Stacy L. Volkert; Insomnia Is the Most Commonly Reported Symptom and Predicts Other Symptoms of Post-Traumatic Stress Disorder in U.S. Service Members Returning From Military Deployments, Military Medicine, Volume 175, Issue 10, 1 October 2010, Pages 759–762, https://doi.org/10.7205/MILMED-D-10-00193

Alterations in Cognitive Symptoms of PTSD are Correlated with Somatic Symptoms

Ayla Bullock, Anna Burns, Caleigh Shepard, Anna Alkozei, William D.S. Killgore

Objective

Patients with post-traumatic stress disorder (PTSD) experience more somatic illnesses than the general population. However, it is unknown which symptom class(es) of PTSD, including arousal, cognition/mood, intrusion, and avoidance, most strongly predict somatic symptoms (SS). In addition, depression and poor sleep quality, both symptoms of PTSD, also impact physical health. This study aimed to identify the symptom class of PTSD most associated with SS, controlling for depression and sleep quality. On the basis of prior findings that cognition and mood can influence physical health, we hypothesized that alterations in cognitive and mood symptoms would predict the severity of SS.

Participants and Methods

Seventy-five individuals meeting DSM-5 criteria for PTSD (65.3% female; mean age=31.8, *SD*=8.8) were administered the Clinician-Administered PTSD Scale for the DSM-5 (to obtain scores for each symptom class), a self-report questionnaire on SS (e.g. headaches, dizziness), the Beck Depression Inventory (BDI), and the Insomnia Severity Scale (ISI). A hierarchical linear regression analysis was conducted with BDI and ISI scores entered in the first step as covariates and the four PTSD symptom classes entered stepwise in the second step.

Results

BDI and ISI scores significantly predicted SS (R^2=.22, p<.001). Of the four symptom classes, only cognition/mood significantly predicted an additional 5% of the variance in SS (R^2 change=.05, β=.298, p=.030).

Conclusion

After controlling for sleep and depression, cognitive and mood symptoms significantly predicted general somatic symptoms. This suggests a possible influence of maladaptive changes in mood and cognition on SS in individuals with PTSD, perhaps via increased allostatic load and HPA- axis dysfunction secondary to perceived stresses. One potential explanation for this finding is that individuals experiencing troublesome physical symptoms have fewer cognitive resources to combat maladaptive thoughts that may exacerbate symptoms (e.g., “I cannot handle this pain”). These findings point to a potential intervention avenue for addressing somatic issues via treatments aimed at cognition and mood.

The Effect of Blue Light Therapy on Functional Brain Responses to Masked Fearful Stimuli in Post-Traumatic Stress Disorder

Delaney Jecmen, Rylee King, Jennifer Gould, Jordan Mitchell, Katelyn Ralston, Anna Alkozei, William D. "Scott" Killgore

Introduction

Post-Traumatic Stress Disorder (PTSD) is often associated with an increased emotional response to aversive stimuli. Blue Light Therapy (BLT) is effective for improving sleep and mood in a number of psychological disorders but has not yet been evaluated as a treatment for PTSD. We hypothesized that 6 weeks of daily morning BLT, in comparison to Amber (placebo) Light Therapy (ALT), would lead to significant improvements in PTSD severity as well as reduced functional brain responses to subliminal presentation of threat.

Methods

Forty-one participants with a clinical diagnosis of PTSD underwent two fMRI scans separated by 6 weeks of either daily BLT (n=22) or ALT (n=19). PTSD severity was evaluated using the Clinician-Administered PTSD Scale for DSM-5. During fMRI, participants completed the Backwards Masked Affect Task with fearful faces masked by neutral faces.

Results

Both groups showed a significant decrease in their PTSD severity ($F(39, 1)=85.05$, $p<0.001$). However, from pre-to post-treatment, the BLT group showed reduced activity within the anterior insula in response to masked fearful faces (x=-38, y=-20, z= 18; k=17, $p<.001$ uncorrected). For the ALT group, no change was observed.

Conclusion

While both groups showed a reduction in PTSD severity, only individuals who received BLT showed a reduction in their functional brain response to unconsciously perceived fearful face stimuli. These effects may be secondary to improved sleep/circadian timing and its associated influence on mood or conditioned fear responses. Future work will focus on linking sleep- related outcomes to these findings.

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Blue Light Therapy Enhances Sleep and Fear Extinction Recall in PTSD

William D. S. Killgore

Sleep problems are often described as the "hallmark symptom" of post-traumatic stress disorder (PTSD). Patients with PTSD are often deficient in the ability to retain and recall extinction memories relative to those without PTSD. Because memory consolidation is strongly influenced by sleep, we hypothesized that re-entrainment of sleep and circadian rhythms via daily morning exposure to blue-wavelength light would enhance consolidation and retention of learned extinction memories following fear conditioning in patients with PTSD.

Thirty-eight individuals with PTSD (18 male; Age=30.8, SD=9.0) underwent a fear conditioning and extinction protocol and then randomly assigned to receive either BLUE (n=20) or placebo AMBER (n=18) morning light therapy for 30-minutes daily for 6-weeks. Post-treatment extinction recall was measured. Extinction recall magnitude (ERM) at follow-up was calculated (i.e., skin conductance difference between the "extinguished" and the "never-extinguished" stimuli).

BLUE light increased sleep duration relative to AMBER ($p<.05$), and led to greater ERM than AMBER placebo after 6-weeks ($p<.05$). Moreover, post-treatment ERM was correlated with improvement in sleep for the BLUE ($r=.44$, $p<.05$) but not the AMBER group ($r=-.09$, ns).

Six-weeks of daily morning BLUE-wavelength light led to increased sleep duration and greater retention of extinction memories in patients with PTSD. Improved sleep appears critical for retaining extinction memory, a core element of most behavioral PTSD treatments. Blue light treatment may facilitate treatment gains by stabilizing sleep in a manner that promotes consolidation of extinction memory.

Support: USAMRMC (W81XWH-14-1-0570).

Morning Blue Light Improves Consolidation of Fear Extinction Memory in PTSD

William D. S. Killgore, Anna I. Burns, Ayla Bullock, John R. Vanuk, Emily Taylor, and Anna Alkozei

Background

Disturbed sleep is considered to be the "hallmark symptom" of post-traumatic stress disorder (PTSD). Individuals with PTSD also demonstrate a deficit in the ability to recall extinction memories that are formed following experimental fear conditioning relative to those without the disorder. We hypothesized that daily morning blue light exposure would enhance consolidation and retention of learned extinction memory among patients with PTSD.

Methods

Patients meeting DSM-5 criteria for PTSD (18 male; Age=30.8, SD=9.0) completed a fear conditioning and extinction protocol before random assignment to 6-weeks of daily 30- minute BLUE (469 nm; n=20) or placebo AMBER (578 nm; n=18) morning light therapy. After treatment, participants completed an extinction recall test with the same previously conditioned stimuli.

Results

Compared to AMBER light, BLUE light showed an increase in sleep duration ($p=.016$). Participants in the BLUE group also showed sustained retention of extinction memory, while those in the AMBER group showed a resurgence of the fear response ($p=.016$). Retention of extinction memory correlated with improved sleep for the BLUE ($r=.44$, $p<.05$) but not the AMBER group ($r=-.09$, ns). BLUE light showed reduced activation of the dorsal anterior cingulate, hippocampus, and amygdala ($p < .05$, FDR corrected) during functional magnetic resonance imaging (fMRI).

Conclusions

BLUE light therapy increased sleep duration and retention of extinction memory, and reduced responsiveness of the fear neurocircuitry to previously feared stimuli. Leading exposure-based treatments for PTSD are based on principles of fear extinction. Findings suggest that blue light treatment may serve as a useful adjunctive approach to facilitate therapeutic retention.

Support: USAMRMC (W81XWH-14-1-0570).

Co-morbid depressive symptoms are associated with reduced functional brain responses within the insula and visual cortex in response to masked happy faces in individuals with PTSD

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Background

Elevated depressive symptoms are common in individuals with Post Traumatic Stress Disorder (PTSD), but it is unclear how this co-morbidity may influence the processing of positive emotional stimuli. The aim of this study was to investigate the influence of depressive symptoms on functional brain responses to subliminal presentation of happy faces in individuals with PTSD. We hypothesized that higher depressive symptoms would be associated with reduced activation within the insular cortex, in response to masked happy faces.

Methods

Fifty-five participants who met DSM-V criteria for PTSD, were administered the Beck Depression Inventory (BDI-II) as a measure of depressive symptoms and underwent fMRI while completing the Backward-Masked Affect Task (BMAT). During the BMAT, participants were exposed to briefly displayed (<20 ms) happy facial expressions masked immediately by neutral facial expressions for a longer duration, leading to conscious masking of the emotional expression.

Results

In response to masked happy faces, BDI-II scores were negatively correlated with activation within the insula (x=42, y=-30, z=20; k=104, $p_{FWE\text{-}corr} = 0.008$) and visual cortex (x=-18,y= -86, z=30; k=61, $p_{FWE\text{-}corr} = 0.09$). A follow-up stepwise regression showed that the model including both insula and visual cortex activation best explained variations in depressive symptoms (R^2=0.41, p=0.047).

Conclusion

These results suggest that individuals with PTSD who also exhibit high levels of depressive symptoms may be less likely to attend to and process positive stimuli in their environment. Targeted treatment for this patient group may benefit from including attention bias modification to enhance attention towards and deeper emotional processing of positive emotional stimuli.

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Use of Family Words in Trauma Narratives Predicts a Higher Risk of Insomnia in Individuals with PTSD

Ayla Bullock, Caleigh Shephard, Anna Burns, Adam Raikes, Anna Alkozei, William D.S. Killgore

Objective

A small body of research indicates that the content of trauma narratives can be useful in predicting various outcomes in individuals with post-traumatic stress disorder (PTSD). Sleep disturbance is common and highly distressing for individuals with PTSD. Therefore, we sought to identify predictors of insomnia using linguistic analysis of trauma narratives. We hypothesized that use of family words in trauma narratives would predict a higher likelihood of insomnia in individuals with PTSD.

Participants and Method

Seventy-five individuals meeting DSM-5 criteria for PTSD (65.3% female; mean age=31.8, *SD*=8.8) were administered the Insomnia Severity Index (ISI), the PTSD Checklist for the DSM- 5 (PCL-5), and were asked to type a description of their traumatic event. Individuals with an ISI score of 15 or higher were coded as having moderate-to-severe insomnia (vs. mild to none). The Linguistic Inquiry and Word Count 2015 text analysis program was used to calculate the frequency of family words in participants' trauma narratives. To answer the primary hypothesis, we fit a logistic regression, with insomnia (1 = insomnia) as the dependent variable and use of family words (1 = any family words present) as the independent variable. To account for potential differences in overall PTSD symptom severity between individuals who did and did not mention family words, an independent-samples t-test was performed using scores on the PCL-5.

Results

Out of 75 participants, 20 individuals mentioned family words in their trauma narratives. Participants who mentioned family words in trauma narratives were 7.31 times more likely to self-report moderate-to-severe insomnia severity than individuals who did not (odds ratio = 7.32, 95% CI: 1.92-27.90) despite the two groups not differing in in PTSD symptom severity ($t(73)=-.712$, $p=.479$).

Discussion

These results indicate that individuals for whom family is salient in their trauma narratives have a greater likelihood of experiencing moderate-to-severe insomnia than those for whom family is not salient. This finding may indicate a greater risk of insomnia for those who experienced violence inside their home versus other types of interpersonal violence outside of the home (e.g. mugging). This finding highlights the importance of targeting sleep difficulties in individuals with PTSD who may no longer feel safe in their own home and experience hypervigilance at night.

Using Blue Light to Consolidate Fear Extinction Memory in PTSD

W. Killgore, A. Burns, A. Bullock, J. Vanuk, E. Taylor, A. Alkozei1

Background

Disrupted sleep is often cited as the "hallmark symptom" of post-traumatic stress disorder (PTSD). Beyond their sleep problems, patients with PTSD also typically show a deficit in the ability to recall extinction memories that are formed following experimental fear conditioning relative to those without the disorder. Given the critical role of sleep in memory consolidation, we hypothesized that improvement of sleep and circadian timing via daily morning blue light exposure would enhance consolidation and retention of learned extinction memory among patients with PTSD.

Methods

Patients meeting DSM-5 criteria for PTSD (18 male; 20 female; Age=30.8, SD=9.0) completed a well-validated fear conditioning and extinction protocol before being randomly assigned to receive either daily 30-minute BLUE (469 nm; n=20) or placebo AMBER (578 nm; n=18) morning light therapy for 6-weeks. After treatment, participants completed an extinction recall test with the same previously conditioned stimuli. We calculated an extinction recall magnitude (ERM) index at follow-up (i.e., the difference in skin conductance response (SCR) between the "extinguished" and the "never-extinguished" stimuli).

Results

Relative to AMBER light, participants exposed to BLUE light showed an increase in sleep duration ($p=.016$). Further, after six weeks, participants in the BLUE group showed sustained retention of extinction memory, while those in the AMBER placebo group showed a resurgence of the fear response ($p=.016$). Moreover, retention of ERM correlated with improved sleep on the Insomnia Severity Index for the BLUE ($r=.44$, $p<.05$) but not the AMBER group ($r=-.09$, ns). Finally, BLUE light was associated with reduced activation of the dorsal anterior cingulate, hippocampus, and amygdala ($p < .05$, FDR corrected) during functional magnetic resonance imaging (fMRI).

Conclusions

Relative to placebo, 6-weeks of morning BLUE-wavelength light exposure led to increased sleep duration, greater retention of extinction memory, and reduced responsiveness of the fear neurocircuitry to previously feared stimuli. It is likely that increased sleep quantity or quality during the intervening weeks after extinction led to greater consolidation. Leading exposure-based treatments for PTSD are based on principles of fear extinction. The present outcomes suggest that blue light treatment may serve as a useful adjunctive approach to facilitate treatment gains.

Nightmares are Negatively Associated with Immediate Memory and Visuospatial Performance in Individuals with PTSD

Ayla Bullock, Anna Burns, Anna Alkozei, Emily Taylor, Michael Grandner, William D.S. Killgore

Background

Disturbing dreams and nightmares are common in individuals with post-traumatic stress disorder (PTSD). At present, little research has investigated the associations between nightmares and cognition in these individuals. However, a robust body of research has shown memory and attention impairments among those with PTSD. The present study sought to investigate the potential relationships between cognitive performance and nightmares in this population.

Method

Seventy-five individuals (49 female; *Mage*=31.8, *SDage*=8.8) were administered the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), the PTSD Checklist for the DSM-5 (PCL-5), the Insomnia Severity Index (ISI), the Functional Outcomes of Sleep Questionnaire (FOSQ), the Clinician-Administered PTSD Scale (CAPS), and the Disturbing Dreams and Nightmares Index (DDNSI). Five linear regressions were conducted with index scores on the RBANS subscales (immediate memory, visuospatial/constructional, language, attention, and delayed memory) as the dependent variables and PCL-5, ISI, FOSQ, CAPS symptom class subscales (intrusion, avoidance, cognition, and arousal), and DDNSI scores entered stepwise.

Results

A linear regression revealed that nightmares predicted 15% of the variance in RBANS immediate memory scores (R^2 change=.152, β=-.390, p=.003). A second linear regression revealed that nightmares predicted 9.6% of the variance in RBANS visual memory scores (R^2 change=.096, β=-.310, p=.019). No other independent variables added to either model. None of the independent variables predicted any variance in language, attention, or delayed memory scores.

Discussion

Our analysis revealed a unique contribution of nightmares to immediate memory and visuospatial performance in individuals with PTSD. This finding was not better explained by variation in PTSD severity or sleep. Because sleep and dreams are implicated in memory consolidation, one explanation for our finding is that highly distressing trauma-related dreams (i.e. nightmares) may lack the same memory-improving qualities as ordinary dreams. Additionally, given that immediate memory and visuospatial functioning utilize working memory, perhaps nightmares and deficits in working memory share similar mechanisms.

Self-referential language in trauma narratives predicts shorter sleep duration in women with PTSD

Ayla Bullock, Anna Burns, Emily Taylor, Michael A. Grandner, Mike Miller, Anna Alkozei, William D.S. Killgore

Background

The use of self-referential language, defined as first-person singular pronouns (e.g., I, me, my), in trauma narratives has been found to predict post-traumatic stress disorder (PTSD) severity. Additionally, taking a self-immersed perspective correlates with higher blood pressure reactivity than a self-distanced perspective. Given this relationship between self-immersed perspectives and physiological processes, we investigated the relationship between self- referential language and sleep in people with PTSD, as dysfunctional sleep is a major treatment target in this disorder.

Method

Seventy-five participants (49 females; *Mage*=31.8, *SDage*=8.8) meeting DSM-5 criteria for PTSD were administered the PTSD Checklist for the DSM-5 (PCL-5) and the Pittsburg Sleep Quality Index (PSQI). Sleep duration was assessed with the PSQI. Participants provided typed descriptions of their traumatic event, which were then analyzed using the Linguistic Inquiry and Word Count 2015 software to count instances of first-person singular pronouns ("I" words).

Linear regression, with PCL-5 scores and "I" words entered stepwise, was used to predict scores on the PSQI sleep duration subscale. Use of "I" words between the sexes was also compared.

Results

For females but not males, PTSD severity significantly predicted sleep duration (R^2=.207, p=.001). Additionally, the number of "I" words in the trauma narratives predicted an additional 8% of the variance in sleep duration for females (R^2 change=.083, β=.288, p=.029) but not males. Females used significantly more self-referential language in their narratives (M=11.84, SD=8.42) compared to males (M=5.25, SD=6.10, p=.001).

Discussion

After controlling for PTSD severity, self-referential language in trauma narratives significantly predicted shorter sleep duration in females. While speculative, this finding suggests that treatment approaches for PTSD may benefit from a focus on targeting self-referential processes to improve sleep and PTSD in females but not males. As dysfunctional sleep is a hallmark of PTSD, further investigation into this relationship may illuminate a new treatment avenue for this disorder.

The association between sleep problems and risk-taking behavior differs between racial majority and minority groups

Anna Burns, Ayla Bullock, Emily Taylor, Michael A. Grandner, Anna Alkozei, & William D.S. Killgore

Objective

Individuals with Post-Traumatic Stress Disorder (PTSD) often experience poor sleep quality and elevated self-destructive behaviors. Among healthy individuals, poor sleep quality can lead to increased risk-taking behavior through decreased inhibition and/or increased willingness to take risks. However, it is unclear whether racial/ethnic background may influence this relationship, in particular among individuals with PTSD. We examined whether the relationship between sleep quality and risk propensity would differ between majority and minority racial groups in individuals with PTSD.

Methods

Seventy-six individuals (61.8% female; mean age=31.7, *SD*=8.8) with a clinical diagnosis of PTSD were administered the Functional Outcomes of Sleep Questionnaire (FOSQ) as a measure of sleep-related functional impairment of daily activities, and the Evaluation of Risk (EVAR) Scale as a measure of risk-taking propensity. Forty-seven individuals identified with the majority racial group (Caucasian) and 29 individuals identified themselves within the minority.

Results

There were no significant group differences for FOSQ and total EVAR risk-taking scores. However, the strength of association between measures differed significantly between groups (Z=1.95, p=.051). For the racial/ethnic majority, functional impairments due to lack of sleep were positively associated with risk taking propensity (r=.460, p=.001); this relationship was not present for the minority group (r=.016, p=.936).

Conclusion

Self-reported functional impairments due to sleep loss significantly correlated with risk taking propensity for those who identified themselves as part of the majority racial group but not for individuals who identified as part of a racial minority. Findings suggest that broad conclusions regarding the association between sleep disruption and risk-taking may not apply equally across racial/ethnic groups and such factors should be considered when evaluating studies of sleep and risk behaviors. Whether these differing effects are due to cultural factors or stable differences in biology is not known and will require additional research.

The effects of Morning Blue Light Therapy on Insomnia Severity and PTSD Symptoms in a Clinical Sample

Delaney Jecmen, Rylee King, Jennifer Gould, Jordan Mitchell, Katelyn Ralston, Anna I. Burns, Ayla Bullock, Michael A. Grandner, Anna Alkozei, William D. S. Killgore

Introduction

Individuals with Post Traumatic Stress Disorder (PTSD) often present with insomnia, which may exacerbate other symptoms of the disorder. Morning Blue Light Therapy (BLT) can regulate circadian rhythms and may even improve sleep and mood in individuals with major depressive disorder. However, it is unclear whether morning BLT could also be an effective treatment for the insomnia associated with PTSD. We investigated whether 6 weeks of daily morning BLT would improve insomnia severity and symptom presentation in individuals with PTSD in comparison to a placebo condition of amber light (ALT). We hypothesized that changes in insomnia severity would correlate with improvement in PSTD symptom severity.

Methods

Forty-one participants with a clinical diagnosis of PTSD were randomized to receive 6 weeks of either daily morning BLT (n=22) or ALT (n=19). Insomnia and PTSD symptom severity were evaluated at pre- and post-treatment using the Insomnia Severity Index (ISI) and the Clinician- Administered PTSD Scale (CAPS) for DSM-5, respectively.

Results

Both groups showed a significant decrease in their PTSD symptom severity ($p<0.001$) and insomnia severity ($p<0.001$) over the 6-week treatment period. However, improvement in insomnia severity significantly predicted improvements in PTSD symptom severity for the BLT group only (BLT: $r=0.542$, $p=0.009$; ALT: $r=-0.095$, $p=0.699$). The difference between the two correlation coefficients was significant ($Z=-2.07$, $p=0.039$).

Conclusion

The results suggest that morning BLT may be effective in improving PTSD symptoms by regulating the circadian rhythm and improving sleep. While ALT also led to improved PTSD symptom severity, it appears that those changes cannot be explained by improved sleep and may have other underlying mechanisms (e.g., placebo effect). Morning BLT may be a promising adjunctive method to bolster current treatment approaches for PTSD. Because of its ease of administration, it could be easily added to ongoing treatment as usual. This approach warrants further research.

Habitual Sleep Duration is Negatively Correlated with Emotional Reactivity within the Rostral Anterior Cingulate Cortex in Individuals with PTSD

Rylee King, , Delaney Jecmen, Jordan Mitchell, Katelyn Ralston, Jennifer Gould, Anna I. Burns, Ayla Bullock, Michael A. Grandner, Anna Alkozei, & William D. S. Killgore

Background

Sleep difficulties, such as insomnia, are highly prevalent in individuals with Post-Traumatic Stress Disorder (PTSD). However, sleep deprivation can also increase emotional reactivity to positive (as well as negative) stimuli. While the effects of sleep loss on emotional perception healthy individuals has been documented, it remains unclear how lack of sleep in individuals with PTSD may affect their emotional reactivity to positive stimuli. We hypothesized that lower habitual sleep duration would be associated with greater functional brain activation changes in response to subliminally presented happy faces in brain areas of the reward network, such as the rostral anterior cingulate cortex (rACC).

Methods

Thirty-nine individuals with DSM-5 confirmed PTSD were administered the Pittsburgh Sleep Quality Index (PSQI) as a measure of their average nightly sleep duration over the past month. Participants then underwent fMRI imagining while viewing subliminal presentations of faces displaying happiness, using a backward masked facial affect paradigm to minimize conscious awareness of the expressed emotion. Brain activation to masked happy expressions was regressed against sleep duration in SPM12.

Results

There was a negative correlation between habitual sleep duration and activation within the rACC in response to the masked happy faces (*x=14,y=40,z=0; k=102, pFWE-corr = 0.008*).

Conclusion

Individuals with PTSD who average less sleep at night showed greater emotional reactivity, as indexed by greater functional brain activation changes within an area of the reward network, than individuals who obtained more sleep per night. Future research involving actual sleep duration manipulation will be necessary to determine whether this finding reflects the well- known antidepressant effect of sleep deprivation or a form of greater emotional expression error monitoring among traumatized patients when lacking sleep. Regardless, these findings suggest that insufficient sleep could affect unconsciously perceived emotion in faces and potentially affect social and emotional responses among individuals with PTSD.

Enhancing Fear Extinction Recall in PTSD using Blue Light Therapy

William D. S. Killgore, Anna I. Burns, K. Caleigh Shepard, John R. Vanuk, and Anna Alkozei

Background

Sleep complaints are among the most common problems reported by patients with post-traumatic stress disorder (PTSD). Moreover, during classical fear conditioning and extinction procedures, patients with PTSD also typically show a deficit in the ability to recall extinction memories relative to healthy controls. Because memory consolidation is strongly influenced by sleep, improved entrainment of the circadian sleep-wake pattern via morning blue light exposure facilitate consolidation and retention of learned extinction memories.

Methods

Patients meeting DSM-5 criteria for PTSD (18 male; age=30.8, SD=9.0) completed a classical fear conditioning and extinction protocol and were then randomly assigned to receive 6-weeks of either BLUE (469 nm; n=20) or placebo AMBER (578 nm; n=18) morning light therapy for 30- minutes daily. After 6 weeks, participants completed a post-treatment extinction recall test to examine skin conductance responses to the same previously conditioned stimuli. An extinction recall magnitude (ERM) index was calculated as the difference in skin conductance response (SCR) between the "extinguished" and the "never-extinguished" stimuli.

Results

Total sleep time was improved for BLUE relative to AMBER ($p=.016$) light. Participants in the BLUE group showed sustained retention of extinction memory, while those in the placebo AMBER group showed a resurgence of the fear response after 6-weeks ($p=.016$). Additionally, the ERM was correlated with improvement in sleep on the Insomnia Severity Index for patients receiving BLUE ($r=.44$, $p<.05$) but not AMBER light ($r=-.09$, ns).

Conclusions

Six weeks of daily morning BLUE-wavelength light exposure was associated with increased sleep duration and greater retention of extinction learning in patients with PTSD compared to placebo light. The greater consolidation of the fear extinction memory among the BLUE group was likely due to improvements in sleep, but further research will be necessary to establish this link. Findings suggest that morning blue light may serve to augment ongoing treatments for PTSD by enhancing sleep and consolidation of extinction memories.

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The Effect of PTSD and Co-morbid Depressive Symptoms on Functional Brain Responses to Masked Positive Stimuli

King, R., Jecmen, D., Mitchell, J., Ralston, K., Gould, J., Burns, A., Bullock, A., Alkozei, A., & Killgore, W.D.S

Learning Objectives

1. Describe the impact of Post-Traumatic Stress Disorder (PTSD) and depression on the general population, including active duty and retired military servicemembers.
2. Describe the correlation between PTSD and co-morbid depressive symptoms and functional brain responses to masked happy faces.
3. Discuss methods of targeted therapy as a way to enhance attention towards and deepen emotional processing of emotional stimuli.

Background

Post-Traumatic Stress Disorder (PTSD) is a severe psychiatric response to a traumatic event that leads to characteristic persistent symptoms involving hypervigilance, arousal, avoidance, re- experiencing, or psychological numbing. While lifetime prevalence of PTSD in the general population ranges from about 6 to 9%, current prevalence rates among military personnel and Veterans who have returned from combat deployments in Iraq and Afghanistan are generally double those estimates. Moreover, high levels of depressive symptoms are common in individuals with PTSD, but it is unclear how this co-morbidity may influence the processing of emotional stimuli, particularly positive emotional stimuli. Deficits in the ability to perceive or process positive stimuli could impair recovery. The aim of this study was to investigate the influence of depressive symptoms on functional brain responses to subliminal presentation of happy faces in individuals with PTSD. We hypothesized that higher depressive symptoms would be associated with reduced activation in brain areas involved during emotional processing, such as the insula, in response to masked happy faces. The insula has been associated with playing a major role in subjective feeling and emotional experience. Previous research has shown that the insula is consistently reported as a region that is activated when a subject is presented with emotionally arousing stimuli during functional neuroimaging.

Methods

Fifty-five participants (19 men; 36 women) ranging in age from 20 to 49 years (M=31.2, SD=8.7, who satisfied DSM-V criteria for PTSD based on the Structured Clinical Interview for DSM-5 (SCID-5), took part in this study. From the 55 total participants, 42% (n=23) self-reported physical abuse/assault trauma, 18% (n=10) reported sexual abuse/assault trauma, 15% (n=8) reported war/combat trauma, 7% (n=4) reported accident (e.g., car accident, work-related accident) trauma, 2% (n=1) reported natural disaster trauma, and 16% (n=9) reported other trauma not within these categories. In addition, 18% (n=10) reported prior military service. Participants were administered the Beck Depression Inventory (BDI-II) as a self-report measure of depressive symptoms. Next, participants underwent blood oxygen level dependent (BOLD) functional magnetic resonance imaging (fMRI) on a 3T scanner (TR/TE/flip angle = 3.0 s/30 ms/90°) while completing the Backward-Masked Affect Task (BMAT), a task designed to assess brain responses to stimuli presented below the threshold of conscious awareness. During the BMAT, participants were exposed to happy facial expressions for an extremely short duration (20ms) which were then masked by neutral facial expressions (100ms), a process that essentially prevents conscious perception of the first expression. The task was presented in a block design lasting 180 seconds, with each block lasting 30 seconds. Masked affect blocks alternated with 30 second blocks presenting neutral facial

expressions masked by a separate neutral face. Data were pre-processed with standard pipelines in SPM12, including realignment, unwarping, coregistration, normalization to the standard space of the Montreal Neurologic Institute (MNI), and smoothed using a 6mm FWHM gaussian filter. Second level random effects analysis was conducted in SPM12, contrasting the masked happy versus the masked neutral blocks. All analyses were corrected for family-wise error (FWE) at the whole brain level at $p < .05$. Data from active clusters were then extracted and used for further analyses in SPSS.

Results

BDI-II scores were generally within the 2 to 52 range ($M = 24.4$, $SD = 11.3$). In response to masked happy faces, a whole brain analysis showed that BDI-II scores were negatively correlated with activation within the insula ($x=42, y=-30, z=20$; $k=104$, $p_{FWE\text{-}corr} = 0.008$) and visual cortex ($x=-18, y=-86, z=30$; $k=61$, $p_{FWE\text{-}corr} = 0.09$). A follow-up stepwise regression showed that the model including both insula and visual cortex activation best explained variations in depressive symptoms ($R^2=0.41$, $p=0.047$).

Conclusion

These results suggest that higher levels of depressive symptoms among individuals with PTSD may impair the ability to attend to and process positive affective stimuli in their environment. This could potentially have an adverse impact on recovery, as such individuals may be less influenced by positive social cues and therefore experience lower levels of social reward and validation from those around them. Given that military personnel who have deployed to combat are about twice as likely to show symptoms of PTSD, this may be a particularly important issue for treating servicemembers. These findings suggest that targeted treatment for this patient group that focuses on attention bias modification to enhance attention towards and deepen emotional processing of positive emotional stimuli may prove particularly helpful.

The Effects of Blue Light Therapy on Sleep Latency in Individuals with PTSD: Potential Gender Differences

Ralston, K., King, R., Jecmen, D., Mitchell, J., Gould, J., Burns, A., Bullock, A., Alkozei, A., & Killgore, W.D.S

Background

Sleep issues are among the most common symptoms reported by those with post-traumatic stress disorder (PTSD), with as many as 90% of patients reporting such complaints. Importantly, current treatments have tended to target the sleep problems of female and male patients equally, despite the fact that there are often differences in the nature and phenomenological experience of their traumas. While research has largely been aimed at treating all populations with PTSD related sleep issues similarly, there is not much research on whether gender could potentially alter the effects of issues such as sleep latency. Given that females tend to have higher rates of PTSD diagnoses in the general population than males (5-6% for males and 10-14% for females), it is important to fully understand how gender may play a role in treatment and recovery from PTSD. There are a number of effective behavioral treatments that are currently being used for PTSD. Recently, our lab demonstrated that morning blue light therapy (BLT) shows promise for reducing sleep difficulties in individuals with other co-morbid conditions such as mild traumatic brain injury. However, it is currently unknown whether it could also be utilized to improve sleep quality in individuals with PTSD, and whether treatment effectiveness could be moderated by gender. We have, therefore, been conducting a randomized, placebo-controlled trial of BLT to examine its effectiveness in facilitating recovery from PTSD, possibly through improvement in sleep outcomes. We hypothesized that 6 weeks of BLT in comparison to an amber placebo light (ALT) would improve sleep related symptoms of PTSD (in this case sleep latency). We also explored whether the effectiveness of BLT was moderated by gender.

Methods

Forty-nine participants clinically diagnosed with PTSD (29 female, 20 male), ranging in age from 20 to 49 (M = 34.5, SD = 20.5 years), underwent six weeks of daily morning light treatment for thirty minutes. Out of those forty-nine participants, 29 were female, and 20 were male. One group received blue light (469 nm @ 214 lux; n=24) while the other group received amber light, our control (578 nm @ 188 lux; n=25). Light was administered for 30 minutes each morning, within 2 hours of awakening, but starting no later than 1100 in the morning. At pre- treatment, participants were asked to fill out a sleep questionnaire to determine levels of various sleep problems, one of which was sleep latency. The participants were then asked to complete the same questionnaire at post-treatment. This self-reported sleep latency metric was the dependent variable for this analysis.

Results

Male (M = 36, SD = 18.4) and female (M = 39, SD = 19.8) participants tended to have similar levels of sleep latency at baseline ($t(49)=1.37$, $p=0.18$). Both gender groups showed similar decreases in sleep latency after treatment, $F(63,1)=9.49$, $p=0.003$), and there was no time x group interaction($F(63,1)=0.00$, $p=0.99$). Paired samples t-tests however showed that females, but not males, who received blue light showed a significant decrease in their sleep latency (females: $t(14)=3.54$, $p=0.003$, males: $t(8)=0.527$, $p=0.612$). Males and females in the amber treatment group did not show significant changes (females: $t(10)=1.78$, $p=0.107$; males: $t(13)=1.38$, $p=0.192$).

Conclusion

Overall, the analysis did not show any significant effect of gender. Nonetheless, exploratory analyses did reveal that the BLT appeared to be significantly effective at reducing sleep latency in the females in particular. While preliminary, these findings suggest that BLT was effective for females with PTSD, whereas males did not show such effect. The failure to demonstrate a clear gender x treatment effect may be due to the limited sample sizes available, but the within group findings suggest that further research is warranted with larger samples. If demonstrated in larger samples, such data could be useful for targeting BLT to specific groups who are disproportionately affected by PTSD, such as military personnel. Using a precision medicine approach, our data suggest that BLT may be more indicated to be used in female populations to improve sleep latency, but further, replication and extension of our findings in larger samples and with other sleep measures is needed to make specific recommendations. Further research on the potential reasons for these gender effects is also indicated to better understand the underlying mechanisms. It is possible that females in our study were simply more compliant with the treatment than males for example, and future research will be necessary to elucidate this possibility further.

Abstract 1482

SLEEP AND FEAR EXTINCTION RECALL IN PTSD IMPROVES WITH MORNING BLUE LIGHT EXPOSURE THERAPY

John R. Vanuk, M.A., Psychology, Anna Alkozei, Ph.D, Anna I. Burns, B.A., Ayla D. Bulloock, B.S., William S. Killgore, Ph.D, Psychiatry, University of Arizona, Tucson, AZ

Disrupted sleep is a major feature in numerous clinical disorders and related to decrements in affective memory processing. The prevalence of sleep disruption in post-traumatic stress disorder (PTSD) is suggested to be a key feature that exacerbates the impaired ability to recall extinction memories during experimental fear conditioning for individuals with this disorder when compared to healthy controls. We hypothesized that an intervention employing blue-wavelength light therapy to regulate sleep and stabilize circadian rhythms in patients with PTSD (i.e., via regulated morning exposure) would be associated with improved consolidation and retention of extinction memories during a fear conditioning/extinction paradigm.

Thirty-eight individuals with PTSD (18 male; Age=30.8, SD=9.0) underwent a well-validated fear conditioning/extinction protocol with subsequent assignment to receive morning BLUE (469 nm; n=20) or placebo AMBER (578 nm; n=18) light therapy daily for 30- minutes over 6-weeks. Participants returned after the intervention for post-treatment extinction recall, comprised of exposure to the previously conditioned stimuli, with the difference in skin conductance response between the "extinguished" and the "never-extinguished" stimuli at follow-up calculated as Extinction Recall Magnitude (ERM). BLUE light therapy was associated with an increase in sleep duration relative to AMBER light ($p=.016$). Participants in the BLUE group sustained retention of the extinction memory, while those in the placebo AMBER group showed impairment, characterized by the restoration of the extinguished fear response after 6-weeks ($p=.016$). Improvement in sleep on the Insomnia Severity Index also correlated with the ERM for the BLUE ($r=.44$, $p<.05$) but not the AMBER group ($r=-.09$).

Daily BLUE-wavelength morning light exposure was associated with increased sleep duration and greater retention of extinction learning in patients with PTSD when compared to AMBER-wavelength light. We speculate that improved sleep facilitated by a stabilized circadian rhythm, after fear-learning, led to greater consolidation of the fear extinction memory. Prominent exposure treatments for PTSD incorporate principles of fear extinction, and our findings suggest that blue light treatment may help facilitate treatment gains by promoting the consolidation of extinction memories via improved sleep.

Incorporation of Cardio Exercise is Associated to Increased Levels of Gratitude Among PTSD Patients

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Background

Engaging in exercise among individuals with post-traumatic stress disorder (PTSD), alleviates symptoms such as depression and anxiety. Cardiovascular (CV) exercise is defined as sustained movement for a period that keeps an individual's heart rate to at least 50 percent of its maximum level. Examples of CV exercise includes swimming, running, and cycling. Other forms of exercise include strength training, and light training including exercises such as yoga, and walking. Additionally, the practice of gratitude has been found to improve mental health and to reduce the severity of symptoms experienced by individuals with (PTSD). Given the relationship between exercise and the trait gratitude, we investigated whether gratitude would be increased among people with PTSD who incorporated CV exercise into their regular routine.

Participants and Methods

Eighty-one participants (Age: M =31.1, SD =8.84) with a clinical diagnosis of PTSD based on the Structured Clinical Interview for DSM-5, completed the Day of Scan Questionnaire, DSIQ, a general health survey. Participants indicated if they exercised regularly (n = 45; Age: M =31.1, SD =8.6), and recorded the percentage of time during exercise sessions that involved CV, strength training, and light training activity. The forty-five participants who exercised regularly completed the Gratitude Questionnaire-6 as a measure of trait gratitude. Three separate tests for percent CV, strength and light training exercise were correlated with scores on the trait gratitude using a bivariate Pearson correlation (1-tail) in SPSS. Participants recorded in the DSIQ how many days per week they exercised and the duration of their exercise sessions in minutes. These data were used to estimate the mean number of minutes of exercise per week.

Results

Of eighty-one participants that answered if they exercise regularly in the DSIQ, forty-five recorded "yes" and thirty-six recorded "no" (Age: M =31.1, SD =9.3). For the forty-five participants that exercised regularly, incorporation of cardio exercise was positively correlated with trait gratitude (r=.284., p=.036), incorporation of strength exercise was negatively correlated with trait gratitude (r=-.284., p=.036), and incorporation of light exercise was not significant in correlation with trait gratitude (r=-.087, p=.295). On average those who exercised regularly, worked out for 52.8 minutes per session (Minutes SD=35.2) and 3.9 days per week (Days: M=3.9, SD=1.3), including 44.2 percent (Percentage: SD=32.4) cardio.

Conclusions

Among individuals with PTSD, we found that greater time spent in CV exercise per week was positively correlated with greater trait gratitude. Although an association between strength training and gratitude was found, the negative relationship suggests that more time spent in strength training exercise per week is associated with lower trait gratitude. This may be due to a trade-off that decreases the opportunity for CV exercise. These findings identify incorporation of CV exercise as a potential intervention for increasing gratitude in individuals with PTSD. However, because these data are cross-sectional and correlational, we cannot infer directional causality. As practicing gratitude is known to reduce symptom severity among individuals with PTSD, future investigation into the relationship of incorporation of CV exercise and gratitude in effect to PTSD symptoms may contribute to non-pharmacological treatments.

Severity of PTSD Symptoms is Associated with Greater Levels of Depression and Deficits in Short-Term Memory

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Objective

Cognitive deficits and negative affect are some of the most commonly reported symptoms by individuals that are suffering from post-traumatic stress disorder (PTSD). Of interest, decrements in memory, specifically, are consistently shown within this patient population. Individuals with PTSD often demonstrate a deficit in the ability to recall extinction memories to previously feared stimuli, a phenomenon considered to be a hallmark feature of the disorder, and postulated to drive the prevalence of hyperarousal symptoms and resurgence of behavioral responses when an individual experiences a "triggering" event. An inability to consolidate safety learning results in a vicious cycle that likely contributes to the failure to habituate under conditions of repeated exposure to fear-provoking contexts/stimuli under non-threatening conditions. However, the relationship between PTSD, affect, and cognitive deficits remain unclear; and more so when considering previously demonstrated decrements in attention and memory are associated with negative affect and depression. We addressed this issue by examining how PTSD severity is associated with cognitive abilities and levels of depression in a community sample of individuals diagnosed with current PTSD. We hypothesized that individuals who experienced higher levels of PTSD symptom severity would have decrements in memory, that were mediated by higher levels of self-reported depressive symptoms.

Participants and Methods

Eighty-five patients meeting DSM-5 criteria for PTSD (29 male; Age=31.2, SD=8.8) completed the *Clinician-Administered PTSD Scale for DSM-5* (CAPS-5), a diagnostic instrument that quantifies PTSD symptom prevalence and severity, along with the *Repeatable Battery for the Assessment of Neuropsychological Status* (RBANS), a brief cognitive battery which assesses cognitive abilities across 5 domains, as well as the *Beck Depression Inventory Second Edition* (BDI-II).

Results

We found a significant negative association between PTSD symptom severity and the RBANS total score (β=-.32), independently driven by scores in immediate memory (β=-.38). We also found significant positive associations between scores on the BDI-II (β=.47), in conjunction with negative associations in immediate memory (β=-.28), when incorporating depression into the model. However, depressive symptoms did not mediate the observed relationship between PTSD symptom severity and immediate memory (β=-.12). Effect sizes were minimally affected by the inclusion of gender or IQ in the model, as well.

Conclusions

As hypothesized, greater PTSD symptom severity was related to lower levels of immediate memory ability and greater levels of depression. However, our hypothesis that depression mediates the relationship between deficits in memory and PTSD symptom severity was not supported. Our findings suggest that the decrements in memory capacity observed in individuals with PTSD are not independently driven by deficits in attention and memory impairments that are often observed in individuals suffering from depression. Further research work is necessary to examine whether treatments incorporating exposure and targeting improvements in affect would benefit from conjunctive interventions aimed at enhancing immediate memory capacities, as a means of facilitating subsequent declines in trauma-related symptom severity.

Blue Light Therapy for Sleep Latency in Individuals with PTSD: Sex Differences

Katelyn N. Ralston, Rylee King, Ayla Bullock, Anna Alkozei, Ph.D., & COL William D. S. Killgore, Ph.D. University of Arizona, Tucson, AZ

Learning Objectives

1. Discuss the existing literature on the role of sleep in PTSD.
2. Describe how blue wavelength light affects circadian rhythms and sleep.
3. Discuss potential utility of morning blue light for reducing sleep latency among individuals with PTSD.

Background

Post-traumatic stress disorder (PTSD) is common following combat deployments, and novel interventions are greatly needed to reduce the mental health burden among Service members. Moreover, sleep problems are among the most common symptoms reported by those with post- traumatic stress disorder (PTSD), with as many as 90% of patients reporting such complaints. Importantly, current treatments for PTSD have tended to target the sleep problems of female and male patients equally, despite the fact that there are often differences in the nature and phenomenological experience of their traumas. While research has largely been aimed at treating all populations with PTSD related sleep issues similarly, there is not much research on whether sex could potentially alter the effects of issues such as sleep latency. Given that females tend to have higher rates of PTSD diagnoses in the general population than males (5-6% for males and 10-14% for females), it is important to fully understand how gender may play a role in treatment and recovery from PTSD. There are a number of effective behavioral treatments that are currently being used for PTSD. Recently, our lab demonstrated that morning blue light therapy (BLT) shows promise for reducing sleep difficulties in individuals with other co-morbid conditions such as mild traumatic brain injury. However, it is currently unknown whether it could also be utilized to improve sleep quality in individuals with PTSD, and whether treatment effectiveness could be moderated by gender. We have, therefore, been conducting a randomized, placebo-controlled trial of BLT to examine its effectiveness in facilitating recovery from PTSD, possibly through improvement in sleep outcomes. We hypothesized that 6 weeks of morning BLT in comparison to an amber placebo light (ALT) would improve sleep related symptoms of PTSD (in this case sleep latency). We also explored whether the effectiveness of BLT was moderated by gender.

Methods

Forty-nine participants clinically diagnosed with PTSD (29 female, 20 male), ranging in age from 20 to 49 (M = 34.5, SD = 20.5 years), underwent six weeks of daily morning light treatment for thirty minutes. Out of those forty-nine participants, 29 were female, and 20 were male. One group received blue light (469 nm @ 214 lux; n=24) while the other group received amber light, our control (578 nm @ 188 lux; n=25). Light was administered for 30 minutes each morning, within 2 hours of awakening, but starting no later than 1100 in the morning. At pre- treatment, participants were asked to fill out a sleep questionnaire to determine levels of various sleep problems, one of which was sleep latency. The participants were then asked to complete the same questionnaire at post-treatment. This self-reported sleep latency metric was the dependent variable for this analysis.

Results

With regard to sleep latency, male (M = 36 min, SD = 18.4) and female (M = 39 min, SD = 19.8) participants tended to have similar levels at baseline ($t(49)=1.37$, $p=0.18$). Both males and femalesshowed similar decreases in sleep latency after treatment, $F(63,1)=9.49$, $p=0.003$), and there was no time x group interaction ($F(63,1)<0.01$, $p=0.99$). Paired samples t-tests however showed that females, but not males,

who received blue light showed a significant decrease in their sleep latency (females: t(14)=3.54, p=0.003, males: t(8)=0.527, p=0.612). Males and females in the amber treatment group did not show significant changes (females: t(10)=1.78, p=0.107; males: t(13)=1.38, p=0.192).

Conclusion

Overall, the analysis did not show any significant global moderating effect of sex on the effects of blue light on sleep latency. Nonetheless, exploratory analyses did reveal that the BLT appeared to be significantly effective at reducing sleep latency in the females in particular. While preliminary, these findings suggest that BLT was effective for improving sleep latency in females with PTSD, whereas males did not show such effect. The failure to demonstrate a clear gender x treatment effect may be due to the limited power due to the small sample sizes available, but the significant within group findings for females suggest that further research is warranted with larger samples. If demonstrated in larger samples, such data could be useful for targeting BLT to specific groups who are disproportionately affected by PTSD, such as military personnel. Using a precision medicine approach, our data suggest that BLT may be particularly indicated for use with female populations to improve sleep latency, but further replication and extension of our findings in larger samples and with other sleep measures is still needed. Nonetheless, the present study provides encouraging preliminary findings suggesting that daily morning blue wavelength light therapy may be helpful in reducing sleep latency and may provide the military with an easy to use treatment approach for facilitating recovery.

Appendix E.

Curriculum Vitae

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CHRONOLOGY OF EDUCATION

8/83 - 5/85	A.A. (Liberal Arts), San Antonio College
8/83 - 5/85	A.A.S (Radio-TV-Film), San Antonio College
8/85 - 5/90	B.A. (Psychology), *Summa cum laude* with Distinction, University of New Mexico
8/90 - 5/92	M.A. (Clinical Psychology), Texas Tech University
8/92 - 8/96	Ph.D. (Clinical Psychology), Texas Tech University Dissertation Title: *Development and validation of a new instrument for the measurement of transient mood states: The facial analogue mood scale (FAMS)*. Lubbock, TX: Texas Tech University;1995. Advisor: Bill Locke, Ph.D.

POST-DOCTORAL TRAINING

8/95 - 7/96	Predoctoral Fellow, Clinical Psychology, Yale School of Medicine
8/96 - 7/97	Postdoctoral Fellow, Clinical Neuropsychology, University of OK Health Sciences Center
8/97 - 7/99	Postdoctoral Fellow, Clinical Neuropsychology, University of Pennsylvania Medical School
7/99 - 9/00	Research Fellow, Neuroimaging, McLean Hospital/ Harvard Medical School
9/13 - 5/14	Certificate in Applied Biostatistics, Harvard Medical School

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2001 -	Licensed Psychologist, #966, State of New Hampshire

CHRONOLOGY OF EMPLOYMENT

Academic Appointments

10/00 - 8/02	Instructor in Psychology in the Department of Psychiatry Harvard Medical School, Boston, MA
9/02 - 7/07	Clinical Instructor in Psychology in the Department of Psychiatry Harvard Medical School, Boston, MA
8/07 - 10/10	Instructor in Psychology in the Department of Psychiatry Harvard Medical School, Boston, MA
4/08-	Faculty Affiliate, Division of Sleep Medicine Harvard Medical School, Boston, MA
10/10 - 10/12	Assistant Professor of Psychology in the Department of Psychiatry Harvard Medical School, Boston, MA
10/12 - 6/17	Associate Professor of Psychology in the Department of Psychiatry Harvard Medical School, Boston, MA
7/14-	Professor of Psychiatry—Tenured University of Arizona College of Medicine, Tucson, AZ
7/14-	Professor of Medical Imaging University of Arizona College of Medicine, Tucson, AZ
9/14-	Professor of Psychology University of Arizona College of Science, Tucson, AZ

Hospital/Clinical/Institutional Appointments

10/00 - 8/02	Assistant Research Psychologist, McLean Hospital, Belmont, MA
8/02 - 7/04	Research Psychologist, Department of Behavioral Biology, Walter Reed Army Institute of Research, Silver Spring, MD
7/04 - 10/07	Chief, Neurocognitive Performance Branch, Walter Reed Army Institute of Research, Silver Spring, MD
10/07 - 3/10	DoD Contractor, Chief Psychologist, GovSource, Inc., U.S. Department of Defense (DoD)
8/08	Consulting Psychologist, The Brain Institute, University of Utah
9/02 - 4/05	Special Volunteer, National Institute on Deafness and Other Communication Disorders (NIDCD), National Institutes of Health (NIH), Bethesda, MD
9/02 - 7/07	Research Consultant, McLean Hospital, Belmont, MA
8/05 - 5/06	Neuropsychology Postdoctoral Research Program Training Supervisor, Walter Reed Hospital, Washington, DC
8/07 -6/17	Research Psychologist, McLean Hospital, Belmont, MA
7/10 - 6-11	DoD Contractor, Consulting Psychologist, Clinical Research Management (CRM)
7/11 - 6/14	Director, Social Cognitive, and Affective Neuroscience (SCAN) Laboratory, McLean Hospital, Belmont, MA
7/14-	Director, Social, Cognitive, and Affective Neuroscience (SCAN) Laboratory, University of Arizona, Tucson, AZ
3/16 -12/18	ORISE Knowledge Preservation Fellow; Walter Reed Army Institute of Research, Silver Spring, MD
1/19-	Senior Statistical Analyst: TechWerks, LLC; Walter Reed Army Institute of Research, Silver Spring, MD

Military Positions

11/01 - 8/02	First Lieutenant, Medical Service Corps, United States Army Reserve (USAR)
8/02 - 7/05	Captain, Medical Service Corps, United States Army-Active Regular Army (RA)
8/05 - 10/07	Major, Medical Service Corps, United States Army-Active Regular Army (RA)
10/07 - 7/12	Major, Medical Service Corps, United States Army Reserve (USAR)
7/12 – 9/19	Lieutenant Colonel, Medical Service Corps, United States Army Reserve (USAR)

3/16 -	Deputy Consultant to the Surgeon General of the Army (SGA) for 71F Research Psychology, US Army Reserves
9/19-	Colonel, Medical Service Corps, United States Army Reserve (USAR)

HONORS AND AWARDS

1990	Outstanding Senior Honors Thesis in Psychology, University of New Mexico
1990-1995	Maxey Scholarship in Psychology, Texas Tech University
2001	Rennick Research Award, Co-Author, International Neuropsychological Society
2002	Honor Graduate, AMEDD Officer Basic Course, U.S. Army Medical Department Center and School
2002	Lynch Leadership Award Nominee, AMEDD Officer Basic Course, U.S. Army Medical Department Center and School
2003	Outstanding Research Presentation Award, 2003 Force Health Protection Conference, U.S. Army Center for Health Promotion and Preventive Medicine
2003	Who's Who in America
2004	Who's Who in Medicine and Healthcare
2005	Edward L. Buescher Award for Excellence in Research by a Young Scientist, Walter Reed Army Institute of Research (WRAIR) Association
2009	Merit Poster Award, International Neuropsychological Society
2009	Outstanding Research Presentation Award, 2009 Force Health Protection Conference, U.S. Army Center for Health Promotion and Preventive Medicine
2010	Best Paper Award, Neuroscience, 27th U.S. Army Science Conference
2011	Published paper included in *Best of Sleep Medicine 2011*
2011	Blue Ribbon Finalist, 2011 Top Poster Award in Clinical and Translational Research, Society of Biological Psychiatry
2012	Defense Advanced Research Projects Agency (DARPA) Young Faculty Award in Neuroscience
2014	Blue Ribbon Finalist, 2014 Top Poster Award in Basic Neuroscience, Society of Biological Psychiatry
2014	Harvard Medical School Excellence in Mentoring Award Nominee
2014	AASM Young Investigator Award (co-author), Honorable Mention, American Academy of Sleep Medicine
2017	Trainee Abstract Merit Award (mentor/co-author), Sleep Research Society
2018	Trainee Abstract Merit Award (mentor/co-author), Sleep Research Society.
2020	Nelson Butters Award for Best Paper by a Postdoctoral Fellow (mentor/co-author), International Neuropsychological Society

SERVICE/OUTREACH

Local/State Service/Outreach

2003	Scientific Review Committee, Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD
2005	Scientific Review Committee, Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD
2012-14	McLean Hospital Research Committee, McLean Hospital, Belmont, MA
2016	House Ad Hoc Committee on Treatment of Traumatic Brain Injuries and Benefits of Hyperbaric Oxygen Therapy, Arizona House of Representatives

National/International Service/Outreach

2004	University of Alabama, Clinical Nutrition Research Center (UAB CNRC) Pilot/Feasibility Study Program Review Committee
2006	U.S. Small Business Administration, Small Business Technology Transfer (STTR) Program Review Committee
2006	Cognitive Performance Assessment Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program Funding Panel
2006	External Member, Doctoral Thesis Committee, Belinda J. Liddle, Ph.D., University of Sydney, Australia
2007	Cognitive Performance Assessment Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program Funding Panel
2008	United States Army Medical Research and Materiel Command (USAMRMC) Congressionally Directed Medical Research Programs (CDMRP) Extramural Grant Review Panel
2008-2011	Long-Distance High School Research Mentor, Christina Song, NY
2009	NIH-CSR Brain Disorders and Clinical Neuroscience N02 Member Study Conflict Section Review Panel
2009	Sleep Physiology and Fatigue Interventions Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program
2009	Scotland, UK, Biomedical and Therapeutic Research Committee, Grant Reviewer
2010	Canada, Social Sciences and Humanities Research Council of Canada, Grant Reviewer
2011	National Science Foundation (NSF) Grant Reviewer
2011-	National Network of Depression Centers (NNDC), Military Task Group
2011	Israel, Israel Science Foundation (ISF), Grant Reviewer
2011	Scientific Review Committee, US Army Institute of Environmental Medicine (USARIEM)
2012	National Science Foundation (NSF) Grant Reviewer
2012-	American Academy of Sleep Medicine, Member
2013	Israel, Israel Science Foundation (ISF), Grant Reviewer
2014-	Organization for Human Brain Mapping, Member
2015-	Human Affectome Project Advisory Board Member
2016-	Sleep Research Society Member
2017-2018	External Reviewer, Doctoral Thesis Reviewer, Kalina R. Rossa, Queensland University of Technology, Australia.
2018	Marsden Fund Council Grant Proposal Referee, Royal Society Te Aparangi, New Zealand.
2018	External Faculty Promotion Dossier Reviewer, Oregon Health & Science University
2018-2020	Long-Distance High School Research Mentor, Taleen Postian, Byram Hills HS, NY
2019	External Reviewer, Doctoral Thesis Reviewer, William Ryan McMahon, Monash University, Australia.
2020-	Long-Distance High School Research Mentor, Shivani Desai, Phoenix, AZ

Departmental Committees

2006	Chair, Undergraduate Honors Thesis Committee, Jessica Richards, Department of Psychology, University of Maryland, Baltimore County, MD
2012-	Member, Research Committee, McLean Hospital, Belmont, MA
2014	Psychiatry Senior Research Manager Candidate Search Committee, Department of Psychiatry, University of Arizona, Tucson, AZ

2014-2015 Member, Faculty Search Committee, Department of Psychology, University of Arizona, Tucson, AZ.

2014-2016 Member, Comprehensive Examination Committee, Natalie Bryant, Department of Psychology, University of Arizona, Tucson, AZ

2014-2015 Chair/Research Faculty Mentor, Undergraduate Honors Thesis Committee, Haley Kent, Department of Biochemistry, University of Arizona, Tucson, AZ

2014- Member, Psychiatry Research Investigator Committee, Department of Psychiatry, University of Arizona, Tucson, AZ.

2015 Member, Dissertation Committee, Ryan S. Smith, Ph.D., Department of Psychology, University of Arizona, Tucson AZ.

2015 Imaging Excellence Cluster Hire Search Committee, Department of Medical Imaging, University of Arizona, Tucson, AZ

2015- Member, Mentoring Committee, Department of Psychiatry, University of Arizona, Tucson, AZ

2016 Member, Chief of Neuroradiology Faculty Search Committee, Department of Medical Imaging, University of Arizona, Tucson, AZ

2016-2017 Member, Dissertation Committee, Brian Arizmendi, Department of Psychology, University of Arizona, Tucson, AZ

2016-2017 Member, Masters Thesis Committee, Saren Seeley, Department of Psychology, University of Arizona, Tucson, AZ

2016-2017 Member, Masters Thesis Committee, Mairead McConnell, Department of Psychology, University of Arizona, Tucson, AZ

2016-2018 Member, Masters Thesis Committee, John Vanuk, Department of Psychology, University of Arizona, Tucson, AZ

2016-2017 Faculty Advisor, Undergraduate Honor Thesis Committee, Matthew Nettles, Neuroscience/Cognitive Science, University of Arizona, Tucson, AZ

2016- Scientific Review Committee, Department of Psychiatry, University of Arizona, Tucson, AZ

2017-2018 Faculty Advisor, Undergraduate Honors Thesis Committee, Debby Waugaman, Psychology, University of Arizona, Tucson, AZ

2017-2018 Faculty Advisor, Undergraduate Honors Thesis Committee, Jun Lee, Department of Psychology, University of Arizona, Tucson, AZ

2017- Chair, Psychiatry Research Committee, Department of Psychiatry, University of Arizona, Tucson, AZ

2017- Member, Promotion and Tenure Committee, Department of Psychiatry, University of Arizona, Tucson, AZ

2019 Member, Comprehensive Examination Committee, Ji-Soo Kim, Department of Psychology, University of Arizona, Tucson, AZ

2019 Member, Comprehensive Examination Committee, John Vanuk, Department of Psychology, University of Arizona, Tucson, AZ

2019-2020 Member, Masters Thesis Committee, Veronica Kraft, Department of Psychology, University of Arizona, Tucson, AZ

2019-2020 Faculty Advisor, Undergraduate Honors Thesis Committee, Giovanna Gutierrez, Department of Neuroscience and Cognitive Science, University of Arizona, Tucson, AZ

2019-2020 Faculty Advisor, Undergraduate Honors Thesis Committee, Corinne Meinhausen, Department of Neuroscience and Cognitive Science, University of Arizona, Tucson, AZ

2019-2020 Faculty Advisor, Undergraduate Honors Thesis Committee, Jared Kleiner, Department of Neuroscience and Cognitive Science, University of Arizona, Tucson, AZ

2020 Member, Comprehensive Examination Committee, Sophie Pinkston, Department of Psychology, University of Arizona, Tucson, AZ

2020- Co-Chair, Dissertation Committee, John Vanuk, Department of Psychology, University of Arizona, Tucson, AZ.
2020- Member, Comprehensive Examination Committee, Veronica Kraft, Department of Psychology, University of Arizona, Tucson, AZ
2021 Chair, Research Task Force for College of Medicine Strategic Plan, Department of Psychiatry, University of Arizona, Tucson, AZ

University Committees/Service

2014 Ad Hoc Member, Interview Committee for Defense and Security Research Institute Director Position, University of Arizona, Tucson, AZ.
2014-2018 Member, Mechanisms of Emotion, Social Relationships, and Health Interdisciplinary Developing Research Program, Clinical and Translational Science Institute, BIO5, University of Arizona, Tucson, AZ
2015 Vice President's Executive Committee for Defense and Security Strategic Planning, University of Arizona, Tucson, AZ
2015- MRI Operations Committee, University of Arizona, Tucson, AZ
2016 Faculty Mentor, Undergraduate Biology Research Program (UBRP), University of Arizona, Tucson, AZ
2016 Faculty Mentor, Border Latino & American Indian Summer Exposure to Research (BLAISER) Program, University of Arizona, Tucson, AZ
2016 Faculty Mentor, Medical Student Research Committee (MSRC) Program, University of Arizona College of Medicine, Tucson, AZ
2018 Administrative Review Committee: Psychiatry Department Chair
2019 Reviewer, Psychology Department Faculty Pilot Grant Program
2019 Reviewer, Arizona Alzheimer's Consortium
2019- 3T Faculty Advisory Committee, University of Arizona, Tucson, AZ
2019 Faculty Mentor, Steps 2 STEM High School Research Internship Program, Tucson, AZ
2020 Sleep & Circadian Science Center Construction Manager at Risk Search Committee, Tucson, AZ
2020- Sleep & Circadian Science Center Oversight Committee, Tucson, AZ.

Editorial Board Membership

2009-2018 Editorial Board Member, International Journal of Eating Disorders
2012- Editorial Board Member, Dataset Papers in Neuroscience
2012- Editorial Board Member, Dataset Papers in Psychiatry
2012- Editor, Journal of Sleep Disorders: Treatment and Care

Ad Hoc Journal Reviewer (106 Journals)

2001-2012 Reviewer, Psychological Reports
2001-2012 Reviewer, Perceptual and Motor Skills
2002 Reviewer, American Journal of Psychiatry
2002-2013 Reviewer, Biological Psychiatry
2003 Reviewer, Clinical Neurology and Neurosurgery
2004-2016 Reviewer, NeuroImage
2004-2006 Reviewer, Neuropsychologia
2004-2016 Reviewer, Journal of Neuroscience

2004	Reviewer, Consciousness and Cognition
2005	Reviewer, Experimental Brain Research
2005	Reviewer, Schizophrenia Research
2005-2012	Reviewer, Archives of General Psychiatry
2005	Reviewer, Behavioral Brain Research
2005-2009	Reviewer, Human Brain Mapping
2005-2013	Reviewer, Psychiatry Research: Neuroimaging
2006	Reviewer, Journal of Abnormal Psychology
2006	Reviewer, Psychopharmacology
2006	Reviewer, Developmental Science
2006	Reviewer, Acta Psychologica
2006, 2015	Reviewer, Neuroscience Letters
2006-2020	Reviewer, Journal of Sleep Research
2006-2016	Reviewer, Physiology and Behavior
2006-2021	Reviewer, SLEEP
2007	Reviewer, Journal of Clinical and Experimental Neuropsychology
2008	Reviewer, European Journal of Child and Adolescent Psychiatry
2008	Reviewer, Judgment and Decision Making
2008-2010	Reviewer, Aviation, Space, & Environmental Medicine
2008	Reviewer, Journal of Psychophysiology
2008	Reviewer, Brazilian Journal of Medical and Biological Research
2008	Reviewer, The Harvard Undergraduate Research Journal
2008	Reviewer, Bipolar Disorders
2008-2013	Reviewer, Chronobiology International
2008	Reviewer, International Journal of Obesity
2009	Reviewer, European Journal of Neuroscience
2009-2018	Reviewer, International Journal of Eating Disorders
2009	Reviewer, Psychophysiology
2009	Reviewer, Traumatology
2009	Reviewer, Clinical Medicine: Therapeutics
2009	Reviewer, Acta Pharmacologica Sinica
2009	Reviewer, Collegium Antropologicum
2009	Reviewer, Journal of Psychopharmacology
2009-2014	Reviewer, Obesity
2009	Reviewer, Scientific Research and Essays
2009	Reviewer, Child Development Perspectives
2009-2010	Reviewer, Personality and Individual Differences
2009-2010	Reviewer, Noise and Health
2009-2010	Reviewer, Sleep Medicine
2010	Reviewer, Nature and Science of Sleep
2010	Reviewer, Psychiatry and Clinical Neurosciences
2010	Reviewer, Learning and Individual Differences
2010	Reviewer, Cognitive, Affective, and Behavioral Neuroscience
2010	Reviewer, BMC Medical Research Methodology
2010-2011	Reviewer, Journal of Adolescence
2010-2012	Reviewer, Brain Research
2011	Reviewer, Brain
2011-2019	Reviewer, Social Cognitive and Affective Neuroscience
2011	Reviewer, Journal of Traumatic Stress
2011	Reviewer, Social Neuroscience
2011-2014	Reviewer, Brain and Cognition

2011	Reviewer, Frontiers in Neuroscience
2011-2012	Reviewer, Sleep Medicine Reviews
2012	Reviewer, Journal of Experimental Psychology: General
2012	Reviewer, Ergonomics
2012-2017	Reviewer, Behavioral Sleep Medicine
2012	Reviewer, Neuropsychology
2012	Reviewer, Emotion
2012	Reviewer, JAMA
2012	Reviewer, BMC Neuroscience
2012-2015	Reviewer, Cognition and Emotion
2012	Reviewer, Journal of Behavioral Decision Making
2012	Reviewer, Psychosomatic Medicine
2012-2014	Reviewer, PLoS One
2012	Reviewer, American Journal of Critical Care
2012-2014	Reviewer, Journal of Sleep Disorders: Treatment and Care
2013	Reviewer, Experimental Psychology
2013	Reviewer, Clinical Interventions in Aging
2013	Reviewer, Frontiers in Psychology
2013	Reviewer, Brain Structure and Function
2013	Reviewer, Appetite
2013-2020	Reviewer, JAMA Psychiatry
2014	Reviewer, Acta Psychologica
2014	Reviewer, Neurology
2014	Reviewer, Applied Neuropsychology: Child
2014-2016	Reviewer, Journal of Applied Psychology
2015	Reviewer, Early Childhood Research Quarterly
2015	Reviewer, Behavioral Neuroscience
2015-2021	Reviewer, Scientific Reports
2016-2018	Reviewer, Neuroscience & Biobehavioral Reviews
2016	Reviewer, Psychological Science
2016-2021	Reviewer, Medicine & Science in Sports and Exercise
2016	Reviewer, Archives of Clinical Neuropsychology
2016	Reviewer, Advances in Cognitive Psychology
2017	Reviewer, Data in Brief
2017	Reviewer, Neuroscience
2017-2018	Reviewer, Sleep Health
2017	Reviewer, Journal of Experimental Social Psychology
2017-2018	Reviewer, Neural Plasticity
2018	Reviewer, NeuroImage: Clinical
2018	Reviewer, Journal of Psychiatric Research
2018	Reviewer, Journal of Clinical Sleep Medicine
2019	Reviewer, Harvard Review of Psychiatry
2019	Reviewer, Progress in Brain Research
2020	Reviewer, Journal of Experimental Psychology: Learning, Memory, and Cognition
2020-2021	Reviewer, Psychiatry Research
2021	Reviewer, Health Promotion international
2021	Reviewer, Military Behavioral Health

PUBLICATIONS/CREATIVE ACTIVITY

Refereed Journal Articles

1. **Killgore WD**. The Affect Grid: a moderately valid, nonspecific measure of pleasure and arousal. Psychol Rep. 83(2):639-42, 1998.

2. **Killgore WD**. Empirically derived factor indices for the Beck Depression Inventory. Psychol Rep. 84(3 Pt 1):1005-13, 1999.

3. **Killgore WD**. Affective valence and arousal in self-rated depression and anxiety. Percept Mot Skills. 89(1):301-4, 1999.

4. **Killgore WD**, Adams RL. Prediction of Boston Naming Test performance from vocabulary scores: preliminary guidelines for interpretation. Percept Mot Skills. 89(1):327-37, 1999.

5. **Killgore WD**, Gangestad SW. Sex differences in asymmetrically perceiving the intensity of facial expressions. Percept Mot Skills. 89(1):311-4, 1999.

6. **Killgore WD**. The visual analogue mood scale: can a single-item scale accurately classify depressive mood state? Psychol Rep. 85(3 Pt 2):1238-43, 1999.

7. **Killgore WD**, DellaPietra L, Casasanto DJ. Hemispheric laterality and self-rated personality traits. Percept Mot Skills. 89(3 Pt 1):994-6, 1999.

8. **Killgore WD**, Glosser G, Casasanto DJ, French JA, Alsop DC, Detre JA. Functional MRI and the Wada test provide complementary information for predicting post-operative seizure control. Seizure. 8(8):450-5, 1999.

9. **Killgore WD**. Evidence for a third factor on the Positive and Negative Affect Schedule in a college student sample. Percept Mot Skills. 90(1):147-52, 2000.

10. **Killgore WD**, Dellapietra L. Item response biases on the logical memory delayed recognition subtest of the Wechsler Memory Scale-III. Psychol Rep. 86(3 Pt 1):851-7, 2000.

11. **Killgore WD**, Casasanto DJ, Yurgelun-Todd DA, Maldjian JA, Detre JA. Functional activation of the left amygdala and hippocampus during associative encoding. Neuroreport. 11(10):2259-63, 2000.

12. Yurgelun-Todd DA, Gruber SA, Kanayama G, **Killgore WD**, Baird AA, Young AD. fMRI during affect discrimination in bipolar affective disorder. Bipolar Disord. 2(3 Pt 2):237-48, 2000.

13. **Killgore WD**. Sex differences in identifying the facial affect of normal and mirror-reversed faces. Percept Mot Skills. 91(2):525-30, 2000.

14. **Killgore WD**, DellaPietra L. Using the WMS-III to detect malingering: empirical validation of the rarely missed index (RMI). J Clin Exp Neuropsychol. 22(6):761-71, 2000.

15. **Killgore WD**. Academic and research interest in several approaches to psychotherapy: a computerized search of literature in the past 16 years. Psychol Rep. 87(3 Pt 1):717-20, 2000.

16. Maldjian JA, Detre JA, **Killgore WD**, Judy K, Alsop D, Grossman M, Glosser G. Neuropsychologic performance after resection of an activation cluster involved in cognitive memory function. AJR Am J Roentgenol. 176(2):541-4, 2001.

17. **Killgore WD**, Oki M, Yurgelun-Todd DA. Sex-specific developmental changes in amygdala responses to affective faces. Neuroreport. 12(2):427-33, 2001.

18. **Killgore WD**, Yurgelun-Todd DA. Sex differences in amygdala activation during the perception of facial affect. Neuroreport. 12(11):2543-7, 2001.

19. Casasanto DJ, **Killgore WD**, Maldjian JA, Glosser G, Alsop DC, Cooke AM, Grossman M, Detre JA. Neural correlates of successful and unsuccessful verbal memory encoding. Brain Lang. 80(3):287-95, 2002.

20. **Killgore WD**. Laterality of lesions and trait-anxiety on working memory performance. Percept Mot Skills. 94(2):551-8, 2002.

21. **Killgore WD**, Cupp DW. Mood and sex of participant in perception of happy faces. Percept Mot Skills. 95(1):279-88, 2002.

22. Yurgelun-Todd DA, **Killgore WD**, Young AD. Sex differences in cerebral tissue volume and cognitive performance during adolescence. Psychol Rep. 91(3 Pt 1):743-57, 2002.

23. Yurgelun-Todd DA, **Killgore WD**, Cintron CB. Cognitive correlates of medial temporal lobe development across adolescence: a magnetic resonance imaging study. Percept Mot Skills. 96(1):3-17, 2003.

24. **Killgore WD**, Young AD, Femia LA, Bogorodzki P, Rogowska J, Yurgelun-Todd DA. Cortical and limbic activation during viewing of high- versus low-calorie foods. Neuroimage. 19(4):1381-94, 2003.

25. **Killgore WD**, Yurgelun-Todd DA. Activation of the amygdala and anterior cingulate during nonconscious processing of sad versus happy faces. Neuroimage. 21(4):1215-23, 2004.

26. **Killgore WD**, Yurgelun-Todd DA. Sex-related developmental differences in the lateralized activation of the prefrontal cortex and amygdala during perception of facial affect. Percept Mot Skills. 99(2):371-91, 2004.

27. **Killgore WD**, Glahn DC, Casasanto DJ. Development and Validation of the Design Organization Test (DOT): a rapid screening instrument for assessing visuospatial ability. J Clin Exp Neuropsychol. 27(4):449-59, 2005.

28. **Killgore WD**, Yurgelun-Todd DA. Body mass predicts orbitofrontal activity during visual presentations of high-calorie foods. Neuroreport. 16(8):859-63, 2005.

29. Wesensten NJ, **Killgore WD**, Balkin TJ. Performance and alertness effects of caffeine, dextroamphetamine, and modafinil during sleep deprivation. J Sleep Res. 14(3):255-66, 2005.

30. **Killgore WD**, Yurgelun-Todd DA. Social anxiety predicts amygdala activation in adolescents viewing fearful faces. Neuroreport. 16(15):1671-5, 2005.

31. **Killgore WD**, Yurgelun-Todd DA. Developmental changes in the functional brain responses of adolescents to images of high and low-calorie foods. Dev Psychobiol. 47(4):377-97, 2005.

32. Kahn-Greene ET, Lipizzi EL, Conrad AK, Kamimori GH, **Killgore WD**. Sleep deprivation adversely affects interpersonal responses to frustration. Pers Individ Dif. 41(8):1433-1443, 2006.

33. McBride SA, Balkin TJ, Kamimori GH, **Killgore WD**. Olfactory decrements as a function of two nights of sleep deprivation. J Sens Stud. 24(4):456-63, 2006.

34. **Killgore WD**, Yurgelun-Todd DA. Ventromedial prefrontal activity correlates with depressed mood in adolescent children. Neuroreport. 17(2):167-71, 2006.

35. **Killgore WD**, Vo AH, Castro CA, Hoge CW. Assessing risk propensity in American soldiers: preliminary reliability and validity of the Evaluation of Risks (EVAR) scale--English version. Mil Med. 171(3):233-9, 2006.

36. **Killgore WD**, Balkin TJ, Wesensten NJ. Impaired decision making following 49 h of sleep deprivation. J Sleep Res. 15(1):7-13, 2006.

37. **Killgore WD**, Stetz MC, Castro CA, Hoge CW. The effects of prior combat experience on the expression of somatic and affective symptoms in deploying soldiers. J Psychosom Res. 60(4):379-85, 2006.

38. **Killgore WD**, McBride SA, Killgore DB, Balkin TJ. The effects of caffeine, dextroamphetamine, and modafinil on humor appreciation during sleep deprivation. Sleep. 29(6):841-7, 2006.

39. **Killgore WD**, McBride SA. Odor identification accuracy declines following 24 h of sleep deprivation. J Sleep Res. 15(2):111-6, 2006.

40. **Killgore WD**, Yurgelun-Todd DA. Affect modulates appetite-related brain activity to images of food. Int J Eat Disord. 39(5):357-63, 2006.

41. Kendall AP, Kautz MA, Russo MB, **Killgore WD**. Effects of sleep deprivation on lateral visual attention. Int J Neurosci. 116(10):1125-38, 2006.

42. Yurgelun-Todd DA, **Killgore WD**. Fear-related activity in the prefrontal cortex increases with age during adolescence: a preliminary fMRI study. Neurosci Lett. 406(3):194-9, 2006.

43. **Killgore WD**, Killgore DB, Ganesan G, Krugler AL, Kamimori GH. Trait-anger enhances effects of caffeine on psychomotor vigilance performance. Percept Mot Skills. 103(3):883-6, 2006.

44. **Killgore WD**, Yurgelun-Todd DA. Unconscious processing of facial affect in children and adolescents. Soc Neurosci. 2(1):28-47, 2007.

45. **Killgore WD**, Yurgelun-Todd DA. The right-hemisphere and valence hypotheses: could they both be right (and sometimes left)?. Soc Cogn Affect Neurosci. 2(3):240-50, 2007.

46. **Killgore WD**, Killgore DB. Morningness-eveningness correlates with verbal ability in women but not men. Percept Mot Skills. 104(1):335-8, 2007.

47. **Killgore WD**, Killgore DB, Day LM, Li C, Kamimori GH, Balkin TJ. The effects of 53 hours of sleep deprivation on moral judgment. Sleep. 30(3):345-52, 2007.

48. Rosso IM, **Killgore WD**, Cintron CM, Gruber SA, Tohen M, Yurgelun-Todd DA. Reduced amygdala volumes in first-episode bipolar disorder and correlation with cerebral white matter. Biol Psychiatry. 61(6):743-9, 2007.

49. Kahn-Greene ET, Killgore DB, Kamimori GH, Balkin TJ, **Killgore WD**. The effects of sleep deprivation on symptoms of psychopathology in healthy adults. Sleep Med. 8(3):215-21, 2007.

50. **Killgore WD**. Effects of sleep deprivation and morningness-eveningness traits on risk-taking. Psychol Rep. 100(2):613-26, 2007.

51. **Killgore WD**, Gruber SA, Yurgelun-Todd DA. Depressed mood and lateralized prefrontal activity during a Stroop task in adolescent children. Neurosci Lett. 416(1):43-8, 2007.

52. **Killgore WD**, Yurgelun-Todd DA. Positive affect modulates activity in the visual cortex to images of high calorie foods. Int J Neurosci. 117(5):643-53, 2007.

53. Vo AH, Satori R, Jabbari B, Green J, **Killgore WD**, Labutta R, Campbell WW. Botulinum toxin type-a in the prevention of migraine: a double-blind controlled trial. Aviat Space Environ Med. 78(5 Suppl):B113-8, 2007.

54. **Killgore WD**, Yurgelun-Todd DA. Neural correlates of emotional intelligence in adolescent children. Cogn Affect Behav Neurosci. 7(2):140-51, 2007.

55. **Killgore WD**, Kendall AP, Richards JM, McBride SA. Lack of degradation in visuospatial perception of line orientation after one night of sleep loss. Percept Mot Skills. 105(1):276-86, 2007.

56. **Killgore WD**, Lipizzi EL, Kamimori GH, Balkin TJ. Caffeine effects on risky decision making after 75 hours of sleep deprivation. Aviat Space Environ Med. 78(10):957-62, 2007.

57. **Killgore WD**, Richards JM, Killgore DB, Kamimori GH, Balkin TJ. The trait of Introversion-Extraversion predicts vulnerability to sleep deprivation. J Sleep Res. 16(4):354-63, 2007.

58. **Killgore WD**, Kahn-Green ET, Killgore DB, Kamimori GH, Balkin TJ. Effects of acute caffeine withdrawal on Short Category Test performance in sleep-deprived individuals. Percept Mot Skills. 105(3 pt.2):1265-74, 2007.

59. **Killgore WD**, Killgore DB, McBride SA, Kamimori GH, Balkin TJ. Odor identification ability predicts changes in symptoms of psychopathology following 56 hours of sleep deprivation. J Sensory Stud. 23(1):35-51, 2008.

60. **Killgore WD**, Rupp TL, Grugle NL, Reichardt RM, Lipizzi EL, Balkin TJ. Effects of dextroamphetamine, caffeine and modafinil on psychomotor vigilance test performance after 44 h of continuous wakefulness. J Sleep Res. 17(3):309-21, 2008.

61. Huck NO, McBride SA, Kendall AP, Grugle NL, **Killgore WD**. The effects of modafinil, caffeine, and dextroamphetamine on judgments of simple versus complex emotional expressions following sleep deprivation. Int. J Neuroscience. 118(4):487-502, 2008.

62. **Killgore WD**, Kahn-Greene ET, Lipizzi EL, Newman RA, Kamimori GH, Balkin TJ. Sleep deprivation reduces perceived emotional intelligence and constructive thinking skills. Sleep Med. 9(5):517-26, 2008.

63. **Killgore WD**, Grugle NL, Killgore DB, Leavitt BP, Watlington GI, McNair S, Balkin TJ. Restoration of risk-propensity during sleep deprivation: caffeine, dextroamphetamine, and modafinil. Aviat Space Environ Med. 79(9):867-74, 2008.

64. **Killgore WD**, Muckle AE, Grugle NL, Killgore DB, Balkin TJ. Sex differences in cognitive estimation during sleep deprivation: effects of stimulant countermeasures. Int J Neurosci. 118(11):1547-57, 2008.

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Neurobiology of Sleep and Circadian Rhythms, 9, 100051 (2020).

187. **Killgore, WD**, Cloonan, SA, Taylor, EC, & Dailey, NS. Loneliness: A signature mental health concern in the era of COVID-19. Psychiatry Research, 290, 113117 (2020).

188. **Killgore, WD**, Cloonan, SA, Taylor, EC, Fernandez, F, Grandner, MA, & Dailey, NS. Suicidal ideation during the COVID-19 pandemic: The role of insomnia. Psychiatry Research, 290, 113134 (2020).

189. **Killgore, WD**, Taylor, EC, Cloonan, SA, & Dailey, NS. Psychological resilience during the COVID-19 lockdown. Psychiatry Research, 291, 113216 (2020).

190. **Killgore, WD,** Dailey, NS, Raikes, AC, Vanuk, JR, Taylor E, & Alkozei, A. Blue light exposure enhances neural efficiency of the task positive network during a cognitive interference task. Neuroscience Letters, 735, 135242 (2020).

191. Khader, WS, Fernandez, FX, Seixas, A, Knowlden, A, Ellis, J, Williams, N, Perlis, ML, Jean-Louis, G, **Killgore, WD**, Alfonso-Miller, P, & Grandner, MA. What makes people want to make changes to their sleep? Assessment of Perceived risks of insufficient sleep as a predictor of intent to improve sleep. Sleep Health, 7, 98-104 (2021).

192. Martin, LF, Patwardhan, AM, Jain, SV, Salloum, MM, Freeman, J, Khanna, R, Gannala, P, Goel V, Jones-MacFarland, FN, **Killgore, WD**, Porreca, F, & Ibrahim, MM. The effect of green light exposure on headache frequency and quality of life in migraine patients: A preliminary one-way cross-over clinical trial. Cephalalgia, 41, 135-147 (2021).

193. **Killgore, WD**, Cloonan, SA, Taylor, EC, Allbright, MC, & Dailey, NS. Trends in suicidal ideation over the first three months of COVID-19 lockdowns. Psychiatry Research, 293, 113390 (2020).

194. **Killgore, WD**, Cloonan, SA, Taylor EC, Miller, MM, and Dailey, NS. Three months of loneliness during the COVID-19 lockdown. Psychiatry Research, 293, 113392 (2020).

195. **Killgore, WD**. Lightening the mood: Evidence for blue light exposure in the treatment of post-concussion depression. Expert Review of Neurotherapeutics, 20, 1081-1083 (2020).

196. Martin, L, Porreca, F, Mata, EE, Salloum, M, Goel, V, Gunnala, P, **Killgore, WD**, Jones-MacFarland, FN, Khanna, R, Patwardhan, A, & Ibrahim, MM. Exposure to green light improves pain scores and quality of life in patients with fibromyalgia: A cross over clinical trial. Pain Medicine, 22, 118-130 (2021).

197. Nunez, A, Rhee, JU, Haynes, P, Chakravorty, S, Patterson, F, **Killgore, WD**, Gallagher, RA, Hale, L, Branas, C, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Smoke at night and sleep worse? The associations between cigarette smoking with insomnia severity and sleep duration. Sleep Health (in press).

198. **Killgore, WD**, Cloonan, SA, Taylor, EC, Lucas, DA, & Dailey, NS. Loneliness during the first half-year of the COVID-19 lockdowns. Psychiatry Research, 294, 113551 (2020).

199. **Killgore, WD**, Cloonan, SA, Taylor, EC, Lucas, DA, & Dailey, NS. Alcohol dependence during COVID-19 lockdowns. Psychiatry Research, 296, 113676 (2021).

200. Bajaj, S. & **Killgore, WD**. Association between emotional intelligence and effective brain connectome: A large scale spectral DCM study. NeuroImage, 229, 117750 (2021).

201. Raikes, AC, Dailey, NS, Forbeck, B, Alkozei, A, & **Killgore, WD**. Daily morning blue light therapy for post-mTBI sleep disruption: Effects on brain structure and function. Frontiers in Neurology, 12, 625431 (2021).

202. Bajaj, S., Raikes, AC, Razi, A, Miller, MA, & **Killgore, WD**. Blue-light therapy strengthens resting-state effective connectivity with default mode network after mild TBI. Journal of Central Nervous System Disease (in press).

203. Alkozei, A, Dailey, NS, Bajaj, S, Vanuk, JR, Raikes, AC, and **Killgore, WD**. Exposure to blue wavelength light is associated with increases in bidirectional amygdala-DLPFC connectivity at rest. Frontiers in Neurology, 12, 625443 (2021).

204. Charest, J, Bastien, CH, Ellis, J, **Killgore WD**, & Grandner, MA. The impact of perceived sleep, mood, and alcohol use on verbal, physical, and sexual assault experiences among student-athletes and student non-athletes. International Journal of Environmental Research and Public Health (in press).

205. **Killgore, WD**, Cloonan, SA, Taylor, EC, & Dailey, NS. Mental health during the first weeks of the COVID-19 pandemic in the United States. Frontiers in Psychiatry (in press).

206. **Killgore, WD**, Cloonan, SA, Taylor, EC, & Dailey, NS. The COVID-19 vaccine is here—Now who is willing to get it? Vaccines (in press).

207. Wills, C, Ghani, S, Tubbs, A, Fernandez, FX, Athey, A, Turner, R, Robbins, R, Patterson, F, Warlick, C, Alfonso-Miller, P, **Killgore, WD**, & Grandner, MA. Chronotype and social support among student athletes: Impact on depressive symptoms. Chronobiology International (in press).

208. **Killgore, WD**, Cloonan, SA, Taylor, EC, Anlap, I, & Dailey, NS. Increasing aggression during the COVID-19 lockdowns. Journal of Affective Disorders Reports (in press).

209. Kennedy, KE, Onyeonwu, C, Nowakowski, S, Hale, L, Branas, C, **Killgore, WD**, Wills, CC, & Grandner, MA. Menstrual regularity and bleeding is associated with sleep duration, sleep quality, and daytime sleepiness in a community sample. Journal of Sleep Research (in press).

210. Ghani, SB, Taneja, K, Wills, CC, Tubss, A, Delgadillo, ME, Valencia, D, Halane, M, **Killgore, WD**, and Grandner, MA. Culturally-consistent diet among individuals of Mexican descent at the US-Mexico border is associated with sleep duration and snoring. BMC Nutrition (in press).

211. Kennedy, KE, Bastien, C, Ruby P, **Killgore, WD**, Wills, CC, & Grandner, MA. Nightmare content during the COVID-19 pandemic: Influence of COVID-related stress and sleep disruption. Journal of Sleep Research (in press).

212. **Killgore, WD**, Vanuk, JR, Persich, MR, Cloonan, SA, Grandner, MA, & Dailey, NS. Sleep quality and duration are associated with greater trait emotional intelligence. Sleep Health (in press).

213. Persich, MR, Smith, R, Cloonan, SA, Woods-Lubbert, R, Strong, M, & **Killgore, WD**. Emotional intelligence training as a protective factor for mental health during the COVID-19 pandemic. Depression & Anxiety (in press).

Book Chapters/Editorials/Other Published Articles

1. **Killgore, WD.** Cortical and limbic activation during visual perception of food. In Dube, L, Bechara, A, Dagher, A, Drewnowski, A, Lebel, J, James, P, & Yada, R. (Eds), Obesity Prevention: The Role of Brain and Society on Individual Behavior. Elsevier, Boston, 2010, pp. 57-71.

2. **Killgore, WD.** Asleep at the trigger: Warfighter judgment and decision-making during prolonged wakefulness. In Bartone, P. (Ed), Applying Research Psychology to Improve Performance and Policy. 2010, pp. 59-77.

3. **Killgore, WD.** Effects of Sleep Deprivation on Cognition. In Kerkhof, G. & Van Dongen, H. Progress in Brain Research: Sleep and Cognition. Elsevier, B.V. New York, 2010, pp. 105-129.

4. **Killgore, WD.** Caffeine and other alerting agents. In Thorpy, M. & Billiard, M. (Eds), Sleepiness: Causes, Consequences, Disorders and Treatment. Cambridge University Press, UK, 2011, pp. 430-443.

5. **Killgore WD.** Priorities and challenges for caffeine research: Energy drinks, PTSD, and withdrawal reversal. The Experts Speak Column, J Caffeine Res, 1, 11-12, 2011.

6. **Killgore, WD.** Odor identification ability predicts executive function deficits following sleep deprivation. In Lee-Chiong, T (Ed), Best of Sleep Medicine 2011. National Jewish Health, Denver CO, 2011, pp. 31-33.

7. **Killgore, WD.** Socio-emotional and neurocognitive effects of sleep loss. In Matthews, G. (Ed), Handbook of Operator Fatigue. Ashgate, London UK, 2012, pp. 227-243.

8. **Killgore, WD.** Sleepless nights and bulging waistlines (Editorial). Journal of Sleep Disorders: Treatment and Care, 1(1), doi: 10.4172/jsdtc.1000e101, 2012.

9. **Killgore, WD**, & Penetar, DM. Sleep and Military Operational Effectiveness. In Kushida, CA (Ed), The Encyclopedia of Sleep, 2013, vol. 1, pp. 311-319. Academic Press, Waltham, MA.

10. **Killgore, WD**, Weiner, MR, & Schwab, ZJ. Sleep deprivation, personality, and psychopathic changes. In Kushida, CA (Ed), The Encyclopedia of Sleep, 2013, vol. 1, pp. 264-271. Academic Press, Waltham, MA.

11. Schoenberg, MR, & **Killgore, WD**. Psychologic and Psychiatric Assessment. In Kushida, CA

(Ed), The Encyclopedia of Sleep, 2013, vol. 2, pp. 23-26. Academic Press, Waltham, MA.

12. **Killgore, WD.** Sleep loss and performance. In Moore, BA, & Barnett, JE (Eds), Military Psychologists' Desk Reference, 2013, pp. 241-246. Oxford University Press, New York.

13. Weber, M., & **Killgore, WD**. What are the emerging therapeutic uses of bright light therapy for neurological disorders? (Editorial). Future Neurology, 8, 495-497, 2013.

14. **Killgore WD** & Weber, M. Sleep deprivation and cognitive performance. In Bianchi, M (Ed), Sleep Deprivation and Disease: Effects on the Body, Brain and Behavior, 2014, pp. 209-229. Springer, New York.

15. **Killgore, WD**. Sleep deprivation and behavioral risk taking. In Watson, RR, Sleep Modulation by Obesity, Diabetes, Age and Diet, 2015, pp. 279-287. Elsevier, San Diego, CA.

16. **Killgore, WD**. Lighting the way to better sleep and health (Editorial). Journal of Sleep Disorders: Treatment and Care, 5:1, 2016.

17. Singh, P, & **Killgore WD**. Time dependent differences in gray matter volume post mild traumatic brain injury. Neural Regeneration Research, 11, 920-921, 2016.

18. Klimova, A, Singh, P, & **Killgore WD**. White matter abnormalities in MS: Advances in diffusion tensor imaging/tractography. In Watson, RR & Killgore, WD (Eds), Nutrition and Lifestyle in Neurological Autoimmune Diseases: Multiple Sclerosis. Elsevier, San Diego, CA, pp. 21-28, 2017.

19. Alkozei, A, Smith, R, & **Killgore, WD**. Grateful people are happy and healthy—But why? Frontiers for Young Minds (in press).

20. Smith, R, Alkozei, A, & **Killgore WD**. How do emotions work? Frontiers for Young Minds (in press).

21. Satterfield, BC, & **Killgore, WD**. Sleep loss, executive function, and decision-making. In Grandner, MG (Ed), Sleep and Health. Elsevier, San Diego (in press).

22. Satterfield, BC, Raikes, AC, & **Killgore, WD**. Sleep in social cognition and judgment. In Krizan, Z. (Ed), Sleep, Personality, and Social Behavior. Springer Nature (in press).

23. Raikes, AC, Athey, A, Alfonso-Miller, P, **Killgore, WD**, & Grandner, MA. Author response: Concussion assessment tools—A possible measure of sleepiness? Sleep Medicine, 66, 260-261, 2020.

24. **Killgore, WD**, Penetar, DM, & Capaldi, VF. Military operational effectiveness. In Kushida, CA (Ed), Encyclopedia of Sleep and Circadian Rhythms (2^{nd} Edition). (in press).

25. **Killgore, WD**, & Doty, TJ. Personality and psychopathic changes. In Kushida, CA (Ed), Encyclopedia of Sleep and Circadian Rhythms (2^{nd} Edition). (in press).

26. Doty, TJ, Shoenberg, MR, Dailey, NS, & **Killgore, WD.** Psychologic and psychiatric assessment. In Kushida, CA (Ed), Encyclopedia of Sleep and Circadian Rhythms (2^{nd}

Edition). (in press).

27. Cloonan, SA, Taylor, EC, Persich, MR, Dailey, NS, & **Killgore, WD**. Sleep and resilience during the COVID-19 pandemic. In Gabrielli, F, and Irtelli, F (Eds.). Anxiety, Uncertainty, and Resilience During the Pandemic Period – Anthropological and Psychological Perspectives. IntechOpen (in press).

28. Krupp, K, Madhivanan, P, **Killgore, WD**, Ruiz, JM, Carvajal, S, & Grandner, MA. Neurological manifestations in COVID-19: An unrecognized crisis in our elderly? (Commentary). Advances in Geriatric Medicine and Research (in press).

Books

1. Watson, RR, **& Killgore, WD** (Eds.). Nutrition and lifestyle in neurological autoimmune diseases: Multiple Sclerosis. Elsevier, San Diego, CA, 2017.

Published U.S. Government Technical Reports

1. **Killgore, WD**, Estrada, A, Rouse, T, Wildzunas, RM, Balkin, TJ. Sleep and performance measures in soldiers undergoing military relevant training. USAARL Report No. 2009-13. June, 2009.

2. Kelley, AM, **Killgore, WD**, Athy, JR, Dretsch, M. Risk propensity, risk perception, and sensation seeking in U.S. Army Soldiers: A preliminary study of a risk assessment battery. USAARL Report No. 2010-02. DTIC #: ADA511524. October, 2009.

CONFERENCES/SCHOLARLY PRESENTATIONS

Colloquia

2000	*The Neurobiology of Emotion in Children*, McLean Hospital, Belmont, MA *[Invited Lecture]*
2001	*The Neurobiology of Emotion in Children and Adolescents*, McLean Hospital, Belmont, MA *[Invited Lecture]*
2002	Cortico-Limbic Activation in Adolescence and Adulthood, Youth Advocacy Project, Cape Cod, MA [Invited Lecture]
2008	Lecture on *Sleep Deprivation, Executive Function, and Resilience to Sleep Loss*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*
2008	Lecture on *The Role of Research Psychology in the Army*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*
2008	Lecture on *Combat Stress Control: Basic Battlemind Training*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2009 Lecture entitled *Evaluate a Casualty, Prevent Shock, and Prevent Cold Weather injuries*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA*[Invited Lecture]*

2009 Lecture on *Combat Exposure and Sleep Deprivation Effects on Risky Decision-Making*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2009 Lecture on the *Sleep History and Readiness Predictor (SHARP)*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2009 Lecture on *The Use of Actigraphy for Measuring Sleep in Combat and Military Training*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2010 Lecture entitled *Casualty Evaluation*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2010 Lecture entitled *Combat Stress and Risk-Taking Behavior Following Deployment*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2010 Lecture entitled *Historical Perspectives on Combat Medicine at the Battle of Gettysburg*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2010 Lecture entitled *Sleep Loss, Stimulants, and Decision-Making*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2010 Lecture entitled *PTSD: New Insights from Brain Imaging*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2011 Lecture entitled *Effects of bright light therapy on sleep, cognition and brain function after mild traumatic brain injury*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2011 Lecture entitled *Laboratory Sciences and Research Psychology in the Army*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2011 Lecture entitled *Tools for Assessing Sleep in Military Settings*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2011 Lecture entitled *The Brain Basis of Emotional Trauma and Practical Issues in Supporting Victims of Trauma*, U.S. Department of Justice, United States Attorneys Office, Serving Victims of Crime Training Program, Holyoke, MA *[Invited Lecture]*

2011 Lecture entitled *The Brain Altering Effects of Traumatic Experiences*; 105th Reinforcement Training Unit (RTU), U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2012 Lecture entitled *Sleep Loss, Caffeine, and Military Performance*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2012 Lecture entitled *Using Light Therapy to Treat Sleep Disturbance Following Concussion*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2013 Lecture entitled *Brain Responses to Food: What you See Could Make you Fat*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2013 Lecture entitled *Predicting Resilience Against Sleep Loss*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2014 Lecture entitled *Get Some Shut-Eye or Get Fat: Sleep Loss Affects Brain Responses to Food*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2014 Lecture entitled *Emotional Intelligence: Developing a Training Program*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2014 Lecture entitled *Supporting Cognitive and Emotional Health in Warfighters*. Presented to the Senior Vice President for the Senior Vice President for Health Sciences and Dean of the Medical School, University of Arizona, Tucson, AZ *[Invited Lecture]*

2015 Lecture entitled *Understanding the Effects of Mild TBI (Concussion) on the Brain*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2015 Presentation entitled Superhuman Brains: The Neurocircuitry that Underlies the Ability to Resist Sleep Deprivation. Presented at the Neuroscience Datablitz, University of Arizona, Tucson, AZ *[Invited Lecture]*

2015 Presentation entitled: SCAN Lab Traumatic Stress Study. Presented at the Tucson Veteran Center, Tucson AZ *[Invited Lecture]*

2016 Presentation entitled: SCAN Lab Overview. Presented at the University of Arizona 2016 Sleep workshop, Tucson, AZ *[Invited Lecture]*

2016 Lecture entitled *Trauma Exposure and the Brain*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2016 Presentation entitled *Supporting Cognitive and Emotional Health in Warfighters*. UAHS Development Team, University of Arizona Health Sciences Center, Tucson, AZ *[Invited Lecture]*

2016 Lecture entitled Novel Approaches for Reducing Depression in the Military; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2016 Presentation entitled: SCAN Lab Traumatic Stress and TBI Studies. Presented at the Tucson Veteran Center, Tucson AZ *[Invited Lecture]*

2016 Lecture entitled The Battle for Mosul: An S2 Brief; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2017 Lecture entitled *A New Experimental Treatment for Sleep Problems Following Mild TBI*; 105th IMA Detachment, U.S. Army Reserve Center, Boston, MA *[Invited Lecture]*

2017 Lecture entitled *Basics of Neuroimaging Research*; UA Psychiatry Resident Neuroscience Course, University of Arizona Department of Psychiatry, Tucson, AZ *[Invited Lecture]*

2019 Presentation entitled Physiology Student Opportunities in the Social Cognitive and Affective Neuroscience Lab. Presented at the University of Arizona Physiology Honors Academy, Tucson, AZ *[Invited Discussant]*

2019 Presentation entitled Morning Blue Light Exposure Improves Sleep and Fear Extinction Recall in PTSD. Presented at the University of Arizona Sleep Lecture Series, Tucson, AZ *[Invited Lecture]*

2019 Presentation entitled Morning Blue Light Exposure Improves Sleep and Fear Extinction Recall in PTSD. Presented at the Annual Club Hypnos Meeting Datablitz, San Antonio, TX *[Invited Lecture]*

Seminars

2001 *Using Functional MRI to Study the Developing Brain*, Judge Baker Children's Center, Harvard Medical School, Boston, MA *[Invited Lecture]*

2002 Lecture on the *Changes in the Lateralized Structure and Function of the Brain during Adolescent Development*, Walter Reed Army Institute of Research, Washington, DC *[Invited Lecture]*

2005 Lecture on *Functional Neuroimaging, Cognitive Assessment, and the Enhancement of Soldier Performance*, Walter Reed Army Institute of Research, Washington, DC *[Invited Lecture]*

2005 Lecture on *The Sleep History and Readiness Predictor*: Presented to the Medical Research and Materiel Command, Ft. Detrick, MD *[Invited Lecture]*

2006 Lecture on *Optimization of Judgment and Decision Making Capacities in Soldiers Following Sleep Deprivation*, Brain Imaging Center, McLean Hospital, Belmont MA *[Invited Lecture]*

2006 Briefing to the Chairman of the Cognitive Performance Assessment Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program, entitled *Optimization of Judgment and Decision Making Capacities in Soldiers Following Sleep Deprivation*, Walter Reed Army Institute of Research *[Invited Lecture]*

2005 Briefing to the Chairman of the National Research Council (NRC) Committee on Strategies to Protect the Health of Deployed U.S. Forces, John H. Moxley III, on the *Optimization of Judgment and Decision Making Capacities in Soldiers Following Sleep Deprivation*, Walter Reed Army Institute of Research, Washington, DC *[Invited Lecture]*

2006 Lecture on *Norming a Battery of Tasks to Measure the Cognitive Effects of Operationally Relevant Stressors*, Cognitive Performance Assessment Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program, Washington, DC *[Invited Lecture]*

2007 Lecture on *Cerebral Responses During Visual Processing of Food*, U.S. Army Institute of Environmental Medicine, Natick, MA *[Invited Lecture]*

2007 Briefing on the *Measurement of Sleep-Wake Cycles and Cognitive Performance in Combat Aviators*, U.S. Department of Defense, Defense Advanced Research Projects Agency (DARPA), Washington, DC *[Invited Lecture]*

2007 Lecture on *The Effects of Fatigue and Pharmacological Countermeasures on Judgment and Decision-Making*, U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL *[Invited Lecture]*

2008 Lecture on the *Validation of Actigraphy and the SHARP as Methods of Measuring Sleep and Performance in Soldiers*, U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL *[Seminar]*

2009 Lecture on Sleep Deprivation, *Executive Function, and Resilience to Sleep Loss*: Walter Reed Army Institute of Research AIBS Review, Washington DC *[Invited Lecture]*

2009 Lecture Entitled *Influences of Combat Exposure and Sleep Deprivation on Risky Decision-Making*, Evans U.S. Army Hospital, Fort Carson, CO *[Invited Lecture]*

2009 Lecture on *Making Bad Choices: The Effects of Combat Exposure and Sleep Deprivation on Risky Decision-Making*, 4th Army, Division West, Quarterly Safety Briefing to the Commanding General and Staff, Fort Carson, CO*[Invited Lecture]*

2010 Lecture on *Patterns of Cortico-Limbic Activation Across Anxiety Disorders*, Center for Anxiety, Depression, and Stress, McLean Hospital, Belmont, MA *[Invited Lecture]*

2010 Lecture on *Cortico-Limbic Activation Among Anxiety Disorders*, Neuroimaging Center, McLean Hospital, Belmont, MA *[Invited Lecture]*

2011 Lecture on *Shared and Differential Patterns of Cortico-Limbic Activation Across Anxiety Disorders*, McLean Research Day Brief Communications, McLean Hospital, Belmont, MA *[Invited Lecture]*

2011 Lecture Entitled *The effects of emotional intelligence on judgment and decision making, Military Operational Medicine Research Program Task Area C*, R & A Briefing, Walter Reed Army Institute of Research, Silver Spring, MD *[Invited Lecture]*

2011 Lecture Entitled *Effects of bright light therapy on sleep, cognition, brain function, and neurochemistry following mild traumatic brain injury*, Military Operational Medicine Research Program Task Area C, R & A Briefing, Walter Reed Army Institute of Research, Silver Spring, MD *[Invited Lecture]*

2012 Briefing to GEN (Ret) George Casey Jr., former Chief of Staff of the U.S. Army, entitled *Research for the Soldier*. McLean Hospital, Belmont, MA. *[Invited Lecture]*

2012 Lecture Entitled *Effects of bright light therapy on sleep, cognition, brain function, and neurochemistry following mild traumatic brain injury*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2013 Lecture Entitled *Update on the Effects of Bright light therapy on sleep, cognition, brain function, and neurochemistry following mild traumatic brain injury*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2013 Lecture Entitled *Internet Based Cognitive Behavioral Therapy: Effects on Depressive Cognitions and Brain Function*, Military Operational Medicine Research Program In Progress Review (IPR)

Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD [*Invited Lecture*]

2013 Seminar Entitled *Predicting Resilience Against Sleep Loss*, United States Military Academy at West Point, West Point, NY [*Invited Symposium*].

2014 Lecture entitled *Sleep Loss, Brain Function, and Cognitive Performance*, presented to the Psychiatric Genetics and Translational Research Seminar, Massachusetts General Hospital/Harvard Medical School, Boston, MA *[Invited Lecture]*

2014 Grand Rounds Lecture entitled *Sleep Loss, Brain Function, and Performance of the Emotional-Executive System*. University of Arizona Psychiatry Grand Rounds, Tucson, AZ *[Invited Lecture]*

2014 Psychology Department Colloquium entitled *Sleep Loss, Brain Function, and Performance of the Emotional-Executive System*. University of Arizona Department of Psychology, Tucson, AZ *[Invited Lecture]*

2014 Lecture Entitled *Internet Based Cognitive Behavioral Therapy: Effects on Depressive Cognitions and Brain Function*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2014 Lecture Entitled *The Neurobiological Basis and Potential Modification of Emotional Intelligence Through Affective/Behavioral Training*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2014 Lecture entitled *Supporting Cognitive and Emotional Health in Warfighters*. Presented to the Senior Vice President for t for Health Sciences and Dean of the Medical School, University of Arizona, Tucson, AZ *[Invited Lecture]*

2015 Lecture entitled *Sleep Loss and Brain Responses to Food*. Presented for the Sleep Medicine Lecture Series, University of Arizona Medical Center, Tucson, AZ *[Invited Lecture]*

2015 Presentation entitled *Superhuman Brains: The Neurocircuitry that Underlies the Ability to Resist Sleep Deprivation*. Presented at the Neuroscience Datablitz, University of Arizona, Tucson, AZ *[Invited Lecture]*

2015 Lecture entitled *Sleep Deprivation Selectively Impairs Emotional Aspects of Cognition*. Presented at the Pamela Turbeville Speaker Series, McClelland Institute for Children, Youth, and Families, Tucson, AZ, *[Invited Lecture]*

2015 Lecture Entitled Multimodal Neuroimaging to Predict Resistance to Sleep Deprivation, presented at the Pulmonary Research Conference, Department of Medicine, Sleep Medicine Sleep Lecture Series, University of Arizona College of Medicine, Tucson, AZ *[Invited Lecture]*.

2015 Lecture entitled Sleep Deprivation Selectively Impairs Emotional Aspects of Cognition. Presented at the Pamela Turbeville Speaker Series, McClelland Institute for Children, Youth, and Families, Tucson, AZ, *[Invited Lecture]*

2015 Lecture Entitled *Effects of bright light therapy on sleep, cognition, brain function, and neurochemistry following mild traumatic brain injury*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2015 Lecture Entitled *A Non-Pharmacologic Method for Enhancing Sleep in PTSD*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2015 Lecture Entitled *Internet Based Cognitive Behavioral Therapy: Effects on Depressive Cognitions and Brain Function*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2015 Lecture Entitled *Operating Under the Influence: The Effects of Sleep Loss and Stimulants on Decision-Making and Performance.* Presented at the annual SAFER training for interns and residents, University of Arizona Department of Psychiatry, Tucson AZ *[Invited Lecture]*

2016 Lecture entitled *Translational Neuroimaging: Using MRI Techniques to Promote Recovery and Resilience*. Functional Neuroimaging Course, Spring 2016, Psychology Department, University of Arizona, Tucson, AZ *[Invited Lecture]*

2016 Lecture entitled *Supporting Cognitive and Emotional Health in Warfighters*. Presented at the Department of Behavioral Biology, Walter Reed Army Institute of Research, Silver Spring, MD *[Invited Lecture]*

2016 Lecture Entitled *Internet Based Cognitive Behavioral Therapy: Effects on Depressive Cognitions and Brain Function*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2016 Lecture Entitled *A Model for Predicting Cognitive and Emotional Health from Structural and Functional Neurocircuitry following TBI*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2016 Lecture Entitled *Refinement and Validation of a Military Emotional Intelligence Training Program*, Military Operational Medicine Research Program 2016 Resilience In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2017 Lecture Entitled *Bright Light Therapy for Treatment of Sleep Problems following Mild TBI*, Military Operational Medicine Research Program Combat Casualty Care In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2017 Lecture Entitled *Refinement and Validation of a Military Emotional Intelligence Training Program*, Military Operational Medicine Research Program 2017 Resilience In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2018 Lecture Entitled *Introduction to Chronobiology (Part 1)*, Sleep Research Seminar Series, Walter Reed Army Institute of Research, Silver Spring, MD *[Invited Lecture]*

2018 Lecture Entitled *Introduction to Chronobiology (Part 2)*, Sleep Research Seminar Series, Walter Reed Army Institute of Research, Silver Spring, MD *[Invited Lecture]*

2018 Lecture Entitled *A Non-Pharmacologic Method for Enhancing Sleep in PTSD*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2018 Lecture Entitled *Refinement and Validation of a Military Emotional Intelligence Training Program*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2019 Lecture Entitled *Update: A Non-Pharmacologic Method for Enhancing Sleep in PTSD*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2019 Lecture Entitled *Update: Refinement and Validation of a Military Emotional Intelligence Training Program*, Military Operational Medicine Research Program In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD *[Invited Lecture]*

2019 Grand Rounds Lecture entitled *Light Therapy: Implications for Recovery Following PTSD and mTBI*. University of Arizona Psychiatry Grand Rounds, Tucson, AZ *[Invited Lecture]*

2020 Lecture Entitled *Introduction to Chronobiology (Part 1)*, Sleep Research Seminar Series, Walter Reed Army Institute of Research, Silver Spring, MD *[Invited Lecture]*

2020 Lecture Entitled *Introduction to Chronobiology (Part 2)*, Sleep Research Seminar Series, Walter Reed Army Institute of Research, Silver Spring, MD *[Invited Lecture]*

2020 Lecture Entitled *Modulating Sleep and Circadian Rhythms to Facilitate Recovery from PTSD,* McLean Hospital Neuroscience Seminar Speaker Series, Harvard Medical School, Belmont, MA *[Invited Lecture]*

Symposia/Conferences

1999 Oral Platform Presentation entitled *Functional MRI lateralization during memory encoding predicts seizure outcome following anterior temporal lobectomy*, 27th Annual Meeting of the International Neuropsychological Society, Boston, MA. *[Submitted Presentation]*

2000 Lecture on the *Neurobiology of Emotional Development in Children*, 9th Annual Parents as Teachers Born to Learn Conference, St. Louis, MO *[Invited Lecture]*

2001 Oral Platform Presentation entitled *Sex differences in functional activation of the amygdala during the perception of happy faces*, 29th Annual Meeting of the International Neuropsychological Society, Chicago, IL. *[Submitted Presentation]*

2002 Oral Platform Presentation entitled *Developmental changes in the lateralized activation of the prefrontal cortex and amygdala during the processing of facial affect*, 30th Annual Meeting of the International Neuropsychological Society, Toronto, Ontario, Canada. *[Submitted Presentation]*

2002 Oral Platform Presentation *Gray and white matter volume during adolescence correlates with cognitive performance: A morphometric MRI study*, 30th Annual Meeting of the International Neuropsychological Society, Toronto, Ontario, Canada. *[Submitted Presentation]*

2004 Lecture on *Sleep Deprivation, Cognition, and Stimulant Countermeasures*: Seminar Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Detrick, MD, U.S. Army Medical Research and Materiel Command *[Invited Lecture]*

2004 Lecture on the *Regional Cerebral Blood Flow Correlates of Electroencephalographic Activity During Stage 2 and Slow Wave Sleep: An H215O PET Study*: Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Detrick, MD, U.S. Army Medical Research and Materiel Command *[Invited Lecture]*

2004 Oral Platform Presentation entitled *Regional cerebral metabolic correlates of electroencephalographic activity during stage-2 and slow-wave sleep: An H215O PET Study*, 18th Associated Professional Sleep Societies Annual Meeting, Philadelphia, PA. *[Submitted Presentation]*

2006 Lecture on *The Sleep History and Readiness Predictor*: Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Rucker, AL, U.S. Army Medical Research and Materiel Command *[Invited Lecture]*

2007 Symposium on *Cortical and Limbic Activation in Response to Visual Images of Low and High-Caloric Foods*, 6th Annual Meeting of the International Society for Behavioral Nutrition and Physical Activity (ISBNPA), Oslo, Norway *[Invited Lecture]*

2008 Lecture on *Sleep Deprivation, Executive Function, & Resilience to Sleep Loss*, First Franco-American Workshop on War Traumatism, IMNSSA, Toulon, France *[Invited Lecture]*

2009 Symposium Entitled *Sleep Deprivation, Judgment, and Decision-Making*, 23rd Annual Meeting of the Associated Professional Sleep Societies, Seattle, WA *[Invited Symposium]*

2009 Symposium Session Moderator for *Workshop on Components of Cognition and Fatigue: From Laboratory Experiments to Mathematical Modeling and Operational Applications*, Washington State University, Spokane, WA *[Invited Speaker]*

2009 Lecture on *Comparative Studies of Stimulant Action as Countermeasures for Higher Order Cognition and Executive Function Impairment that Results from Disrupted Sleep Patterns*, Presented at the NIDA-ODS Symposium entitled: Caffeine: Is the Next Problem Already Brewing, Rockville, MD *[Invited Lecture]*

2010 Oral Platform Presentation entitled *Sleep deprivation selectively impairs emotional aspects of cognitive functioning*, 27th Army Science Conference, Orlando, FL. *[Submitted Presentation]*

2010 Oral Platform Presentation entitled *Exaggerated amygdala responses to masked fearful faces are specific to PTSD versus simple phobia*, 27th Army Science Conference, Orlando, FL. *[Submitted Presentation]*

2012 Oral Symposium Presentation entitled *Shared and distinctive patterns of cortico-limbic activation across anxiety disorders*, 32nd Annual Conference of the Anxiety Disorders Association of America, Arlington, VA. *[Invited Symposium]*

2012 Oral Platform Presentation entitled *Shared and unique patterns of cortico-limbic activation across anxiety disorders*. 40th Meeting of the International Neuropsychological Society, Montreal, Canada. *[Submitted Presentation]*

2013 Lecture entitled *Brain responses to visual images of food: Could your eyes be the gateway to excess?* Presented to the NIH Nutrition Coordinating Committee and the Assistant Surgeon General of the United States, Bethesda, MD *[Invited Lecture]*

2014 Symposium Entitled *Operating Under the Influence: The Effects of Sleep Loss and Stimulants on Decision-Making and Performance*, Invited Faculty Presenter at the 34th Annual Cardiothoracic Surgery Symposium (CREF), San Diego, CA [*Invited Symposium*].

2014 Symposium Entitled *The Effects of Sleep Loss on Food Preference*, SLEEP 2014, Minneapolis, MN *[Invited Symposium]*

2015 Symposium Entitled *The Neurobiological Basis and Potential Modification of Emotional Intelligence in Military Personnel*. Invited presentation at the Yale Center for Emotional Intelligence, New Haven, CT *[Invited Lecture]*

2015 Lecture Entitled *Predicting Resilience to Sleep Loss with Multi-Modal Neuroimaging*. Invited presentation at the DARPA Sleep Workshop 2015, Arlington, VA *[Invited Lecture]*

2015 Symposium Entitled: *The Brain and Food: How your (sleepy) Eyes Might be the Gateway to Excess*, Invited Faculty Presenter at the 2015 University of Arizona Update on Psychiatry, Tucson, AZ [*Invited Symposium*].

2015 Oral Platform presentation entitled *Multimodal Neuroimaging to Predict Resistance to Sleep Deprivation*, Associated Professional Sleep Societies (APSS) SLEEP meeting, Seattle, WA *[Invited Lecture]*

2015 Symposium Entitled presentation entitled *Sleep Deprivation and Emotional Decision Making*, Virginia Tech Sleep Workshop, Arlington, VA *[Invited Symposium]*

2016 Oral Platform presentation entitled *Default Mode Activation Predicts Vulnerability to Sleep Deprivation in the Domains of Mood, Sleepiness, and Vigilance*. Presentation given at the Associated Professional Sleep Societies (APSS) SLEEP meeting, Denver, CO *[Invited Lecture]*

2016 Symposium presentation entitled *Short Wavelength Light Therapy Facilitates Recovery from Mild Traumatic Brain Injury*, 2016 Military Health Systems Research Symposium (MHSRS), Orlando, FL *[Invited Lecture]*

2017 Lecture Entitled: *Military Update on Blue Light Therapy for mTBI*. Lecture presented at the DoD Sleep Research Meeting breakout session at the Associated Professional Sleep Societies (APSS) SLEEP meeting, Boston, MA *[Invited Lecture]*

2017 Symposium entitled: *Judgment and Decision Making During Sleep Loss*. Invited symposium presentation at the SLEEP 2017 Trainee Symposium Series, Associated Professional Sleep Societies (APSS) SLEEP meeting, Boston, MA *[Invited Lecture]*

2017 Oral Platform presentation entitled *Short Wavelength Light Therapy Facilitates Recovery from Mild Traumatic Brain Injury*. Presentation given at the Associated Professional Sleep Societies (APSS) SLEEP meeting, Boston, MA *[Invited Lecture]*

2017 Symposium entitled: What makes a super-soldier: Identifying the neural correlates of individual differences in resilience against sleep deprivation. Invited symposium presentation at the 2017 Military Health Systems Research Symposium (MHSRS), Orlando, FL *[Invited Lecture]*

2018 Oral Platform presentation entitled: Short Wavelength Light Therapy Enhances Brain and Cognitive Recovery Following Mild Traumatic Brain Injury. Presentation given at the Arizona Research Institute for Biomedical Imaging (ARIBI) Workshop, Tucson, AZ *[Invited Lecture]*

2018 Session Chair: Healthy Shiftwork? Measures, Mitigation and Functional Outcomes. Session presented at the Associated Professional Sleep Societies (APSS) SLEEP Conference (Session O02), Baltimore, MD *[Session Chair]*

2018 Lecture Entitled: *Lapses During Sleep Loss are Predicted by Gray Matter Volume of the Ascending Reticular Activating Systems*. Lecture presented at the 2nd Annual DoD Sleep Research Meeting breakout session at the Associated Professional Sleep Societies (APSS) SLEEP meeting, Baltimore, MD *[Invited Lecture]*

2018 Oral Platform presentation entitled *Resistance to Sleep Deprivation is Predicted by Gray Matter Volume in the Posterior Brain Stem*. Presentation given at the Associated Professional Sleep Societies (APSS) SLEEP meeting, Baltimore, MD *[Invited Lecture]*

2018 Oral Platform presentation entitled *Why Can't You Just Stay Awake? Resistance to Sleep Deprivation is Associated with Measurable Differences in Brainstem Gray Matter.* Presentation given at the Military Health Systems Research Symposium (MHSRS) 2018 Meeting, Orlando, FL *[Invited Lecture]*

2019 Oral Platform presentation entitled Morning Blue Light Exposure Improves Sleep and Fear Extinction Recall in PTSD. Presentation given at the Associated Professional Sleep Societies (APSS) SLEEP 2019 meeting, San Antonio, TX *[Invited Lecture]*

2019 Oral Platform presentation entitled Blue Light Exposure Enhances Sleep and Fear Extinction Recall in PTSD. Presentation given at the Military Health Systems Research Symposium (MHSRS) 2019 Meeting, Orlando, FL *[Invited Lecture]*

2019 Oral Platform presentation entitled Baseline GABA Levels are Associated with Time-on-Task Performance During Sleep Deprivation. Presentation given at the Military Health Systems Research Symposium (MHSRS) 2019 Meeting, Orlando, FL *[Invited Lecture]*

2020 Oral Platform presentation entitled GABA Levels at Baseline Predict Resistance to Time-on-Task Deficits During Sleep Deprivation. Presentation given at the DoD Sleep Workshop, Feb 2020, Arlington, VA *[Invited Lecture]*

2020 Oral Platform presentation entitled Resilience to Inhibitory Deficits During Sleep Deprivation is Predicted by Prefrontal Gray Matter Volume. Presentation given at the DoD Sleep Workshop, Feb 2020, Arlington, VA *[Invited Lecture]*

2020 Oral Platform presentation entitled Resilience to Inhibitory Deficits During Sleep Deprivation is Predicted by Gray Matter Volume in the Ventrolateral and Ventromedial Prefrontal Cortex. Presentation given at the SLEEP 2020 Virtual Meeting, Philadelphia, PA *[Invited Lecture]*

2021 Symposium Session Moderator for *College of Medicine Research Day Data Blitz*, University of Arizona College of Medicine, Tucson, AZ *[Invited Moderator]*

PEER REVIEWED PUBLISHED ABSTRACTS

1. **Killgore, WD.** Development and validation of a new instrument for the measurement of transient mood states: The facial analogue mood scale (FAMS) [Abstract]. Dissertation Abstracts International: Section B: The Sciences & Engineering 1995; 56 (6-B): 3500.

2. **Killgore, WD,** & Locke, B. A nonverbal instrument for the measurement of transient mood states: The Facial Analogue Mood Scale (FAMS) [Abstract]. Proceedings of the Annual Conference of the Oklahoma Center for Neurosciences 1996, Oklahoma City, OK.

3. **Killgore, WD,** Scott, JG, Oommen, KJ, & Jones, H. Lateralization of seizure focus and performance on the MMPI-2 [Abstract]. Proceedings of the Annual Conference of the Oklahoma Center for Neurosciences 1996, Oklahoma City, OK.

4. **Killgore, WD,** & Adams, RL. Vocabulary ability and Boston Naming Test performance: Preliminary guidelines for interpretation [Abstract]. Archives of Clinical Neuropsychology 1997; 13(1).

5. **Killgore, WD**, Glosser, G, Cooke, AN, Grossman, M, Maldjian, J, Judy, K, Baltuch, G, King, D, Alsop, D, & Detre, JA. Functional activation during verbal memory encoding in patients with lateralized focal lesions [Abstract]. Epilepsia 1998; 39(Suppl. 6): 99.

6. **Killgore, WD.** A new method for assessing subtle cognitive deficits: The Clock Trail Making Test [Abstract]. Archives of Clinical Neuropsychology 1998; 14(1): 92.

7. **Killgore, WD,** & DellaPietra, L. Item response biases on the WMS-III Auditory Delayed Recognition Subtests [Abstract]. Archives of Clinical Neuropsychology 1998; 14(1): 92.

8. **Killgore, WD,** Glosser, G, Alsop, DC, Cooke, AN, McSorley, C, Grossman, M, & Detre, JA. Functional activation during material specific memory encoding [Abstract]. NeuroImage 1998; 7: 811.

9. **Killgore, WD,** & DellaPietra, L. Using the WMS-III to detect malingering: Empirical development of the Rarely Missed Index. [Abstract]. Journal of the International Neuropsychological Society 1999; 5(2).

10. **Killgore, WD,** Glosser, G, & Detre, JA. Prediction of seizure outcome following anterior temporal lobectomy: fMRI vs. IAT [Abstract]. Archives of Clinical Neuropsychology 1999; 14(1): 143.

11. **Killgore, WD,** Glosser, G, King, D, French, JA, Baltuch, G, & Detre, JA. Functional MRI lateralization during memory encoding predicts seizure outcome following anterior temporal lobectomy [Abstract]. Journal of the International Neuropsychological Society 1999; 5(2): 122.

12. **Killgore, WD,** Casasanto, DJ, Maldjian, JA, Alsop, DC, Glosser, G, French, J, & Detre, J. A. Functional activation of mesial temporal lobe during nonverbal encoding [abstract]. Epilepsia, 1999; 40 (Supplement 7): 188.

13. **Killgore, WD,** Casasanto, DJ, Maldjian, JA, Gonzales-Atavales, J, & Detre, JA. Associative memory for faces preferentially activates the left amygdala and hippocampus [abstract]. Journal of the International Neuropsychological Society, 2000; 6: 157.

14. Casasanto, DJ, **Killgore, WD,** Maldjian, JA, Gonzales-Atavales, J, Glosser, G, & Detre, JA. Task-dependent and task-invariant activation in mesial temporal lobe structures during fMRI explicit encoding tasks [abstract]. Journal of the International Neuropsychological Society, 2000; 6: 134. ***[*Winner of Rennick Research Award for Best Research by a Graduate Student]***.

15. **Killgore, WD,** Glahn, D, & Casasanto, DJ. Development and validation of the Design Organization Test (DOT): A rapid screening instrument for assessing for visuospatial ability [abstract]. Journal of the International Neuropsychological Society, 2000; 6: 147.

16. Casasanto DJ, **Killgore, WD,** Glosser, G, Maldjian, JA, & Detre, JA. Hemispheric specialization during episodic memory encoding in the human hippocampus and MTL. Proceedings of the Society for Cognitive Science 2000: Philadelphia, PA.

17. Casasanto, DJ, Glosser, G, **Killgore, WD,** Siddiqi, F, Falk, M, Maldjian, J, Lev-Reis, I, & Detre, JA. FMRI evidence for the functional reserve model of post-ATL neuropsychological outcome prediction. Poster Presented at the David Mahoney Institute of Neurological Sciences 17th Annual Neuroscience Retreat, University of Pennsylvania, April 17, 2000.

18. Casasanto, DJ, **Killgore, WD,** Maldjian, JA, Glosser, G, Grossman, M, Alsop, D. C, & Detre, JA. Neural Correlates of Successful and Unsuccessful Verbal Encoding [abstract]. Neuroimage, 2000 11: S381.

19. Siddiqui, F, Casasanto, DJ, **Killgore, WD,** Detre, JA, Glosser, G, Alsop, DC, & Maldjian, JA. Hemispheric effects of frontal lobe tumors on mesial temporal lobe activation during scene encoding [abstract]. Neuroimage, 2000 11: S448.

20. Oki, M, Gruber, SA, **Killgore, WD,** Yurgelun-Todd, DA. Bilateral thalamic activation occurs during

lexical but not semantic processing [abstract]. Neuroimage, 2000 11: S353.

21. Yurgelun-Todd, DA, Gruber, SA, **Killgore, WD,** & Tohen, M. Neuropsychological performance in first-episode bipolar disorder [Abstract]. Collegium Internationale Neuro-Psychopharmacologicum. Brussels, Belgium. July, 2000.

22. **Killgore, WD,** & DellaPietra, L. Detecting malingering with the WMS-III: A revision of the Rarely Missed Index (RMI) [abstract]. Journal of the International Neuropsychological Society, 2001; 7 (2): 143-144.

23. Casasanto, DJ, Glosser, G, **Killgore, WD,** Siddiqi, F, Falk, M, Roc, A, Maldjian, JA, Levy-Reis, I, Baltuch, G, & Detre, JA. Presurgical fMRI predicts memory outcome following anterior temporal lobectomy [abstract]. Journal of the International Neuropsychological Society, 2001; 7 (2): 183.

24. **Killgore, WD,** & Yurgelun-Todd, DA. Amygdala but not hippocampal size predicts verbal memory performance in bipolar disorder [abstract]. Journal of the International Neuropsychological Society, 2001; 7 (2): 250-251.

25. **Killgore, WD,** Kanayama, G, & Yurgelun-Todd, DA. Sex differences in functional activation of the amygdala during the perception of happy faces [abstract]. Journal of the International Neuropsychological Society, 2001; 7 (2): 198.

26. **Killgore, WD,** Gruber, SA, Oki, M, & Yurgelun-Todd, DA. Amygdalar volume and verbal memory in schizophrenia and bipolar disorder: A correlative MRI study [abstract]. Meeting of the International Congress on Schizophrenia Research. Whistler, British Columbia. April 2001.

27. Kanayama, G, **Killgore, WD,** Gruber, SA, & Yurgelun-Todd, DA. FMRI BOLD activation of the supramarginal gyrus in schizophrenia [abstract]. Meeting of the International Congress on Schizophrenia Research. Whistler, British Columbia. April 2001.

28. Gruber, SA, **Killgore, WD,** Renshaw, PF, Pope, HG. Jr, Yurgelun-Todd, DA. Gender differences in cerebral blood volume after a 28-day washout period in chronic marijuana smokers [abstract]. Meeting of the International Congress on Schizophrenia Research. Whistler, British Columbia. April 2001.

29. Rohan, ML, **Killgore, WD,** Eskesen, JG, Renshaw, PF, & Yurgelun-Todd, DA. Match-warped EPI anatomic images and the amygdala: Imaging in hard places. Proceedings of the International Society for Magnetic Resonance in Medicine, 2001; 9: 1237.

30. **Killgore, WD** & Yurgelun-Todd, DA. Developmental changes in the lateralized activation of the prefrontal cortex and amygdala during the processing of facial affect [Abstract]. Oral platform paper presented at the 30th Annual Meeting of the International Neuropsychological Society, Toronto, Ontario, Canada, February 13-16, 2002.

31. Yurgelun-Todd, DA. & **Killgore, WD.** Gray and white matter volume during adolescence correlates with cognitive performance: A morphometric MRI study [Abstract]. Oral platform paper presented at the 30th Annual Meeting of the International Neuropsychological Society, Toronto, Ontario, Canada, February 13-16, 2002.

32. **Killgore, WD,** Reichardt, R. Kautz, M, Belenky, G, Balkin, T, & Wesensten, N. Daytime melatonin-zolpidem cocktail: III. Effects on salivary melatonin and performance [abstract]. Poster presented at the

17th Annual Meeting of the Associated Professional Sleep Societies, Chicago, Illinois, June 3-8, 2003.

33. **Killgore, WD,** Young, AD, Femia, LA, Bogorodzki, P, Rogowska, J, & Yurgelun-Todd, DA. Cortical and limbic activation during viewing of high- versus low-calorie foods [abstract]. Poster Presented at the Organization for Human Brain Mapping Annual Meeting, New York, NY, June 18-22, 2003.

34. **Killgore, WD,** & Yurgelun-Todd, DA. Amygdala activation during masked presentations of sad and happy faces [abstract]. Poster presented at the Organization for Human Brain Mapping Annual Meeting, New York, NY, June 18-22, 2003.

35. **Killgore, WD,** Stetz, MC, Castro, CA, & Hoge, CW. Somatic and emotional stress symptom expression prior to deployment by soldiers with and without previous combat experience [abstract]. Poster presented at the 6th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2003. ***[*Winner: Best Paper Award]***

36. Wesensten, NJ, Balkin, TJ, Thorne, D, **Killgore, WD,** Reichardt, R, & Belenky, G. Caffeine, dextroamphetamine, and modafinil during 85 hours of sleep deprivation: I. Performance and alertness effects [abstract]. Poster presented at the 75th Annual Meeting of the Aerospace Medical Association, Anchorage, AK, May 2-6 2004.

37. **Killgore, WD,** Braun, AR, Belenky, G, Wesensten, NJ, & Balkin, TJ. Regional cerebral metabolic correlates of electroencephalographic activity during stage-2 and slow-wave sleep: An H215O PET Study [abstract]. Oral platform presentation at the 18th Associated Professional Sleep Societies Annual Meeting, Philadelphia, PA, June 5-10, 2004.

38. **Killgore, WD,** Arora, NS, Braun, AR, Belenky, G, Wesensten, NJ, & Balkin, TJ. Sleep strengthens the effective connectivity among cortical and subcortical regions: Evidence for the restorative effects of sleep using H215O PET [abstract]. Poster presented at the 17th Congress of the European Sleep Research Society, Prague, Czech Republic, October 5-9, 2004.

39. **Killgore, WD,** Arora, NS, Braun, AR, Belenky, G, Wesensten, NJ, & Balkin, TJ An H215O PET study of regional cerebral activation during stage 2 sleep [abstract]. Poster presented at the 17th Congress of the European Sleep Research Society, Prague, Czech Republic, October 5-9, 2004.

40. Wesensten, N, **Killgore, WD,** Belenky, G, Reichardt, R, Thorne, D, & Balkin, T. Caffeine, dextroamphetamine, and modafinil during 85 H of sleep deprivation. II. Effects of tasks of executive function [abstract]. Poster presented at the 17th Congress of the European Sleep Research Society, Prague, Czech Republic, October 5-9, 2004.

41. Balkin, T, Reichardt, R, Thorne, D, **Killgore, WD,** Belenky, G, & Wesensten, N. Caffeine, dextroamphetamine, and modafinil during 85 hours of sleep deprivation. I. Psychomotor vigilance and objective alertness effects [abstract]. Oral paper presentation at the 17th Congress of the European Sleep Research Society, Prague, Czech Republic, October 5-9, 2004.

42. Belenky, G, Reichardt, R, Thorne, D, **Killgore, WD,** Balkin, T, & Wesensten, N. Caffeine, dextroamphetamine, and modafinil during 85 hours of sleep deprivation. III. Effect on recovery sleep and post-recovery sleep performance [abstract]. Oral paper presentation at the 17th Congress of the European Sleep Research Society, Prague, Czech Republic, October 5-9, 2004.

43. Vo, A, Green, J, Campbell, W, **Killgore, WD,** Labutta, R, & Redmond, D. The quantification of disrupted

sleep in migraine via actigraphy: A pilot study [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A281.

44. Kendall, AP, **Killgore, WD,** Kautz, M, & Russo, MB. Left-visual field deficits in attentional processing after 40 hours of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A143.

45. Reichardt, RM, Grugle, NL, Balkin, TJ, & **Killgore, WD.** Stimulant countermeasures, risk propensity, and IQ across 2 nights of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A145.

46. Killgore, DB, McBride, SA, Balkin, TJ, & **Killgore, WD.** Post-stimulant hangover: The effects of caffeine, modafinil, and dextroamphetamine on sustained verbal fluency following sleep deprivation and recovery sleep [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A137.

47. **Killgore, WD,** Balkin, TJ, & Wesensten, NJ. Impaired decision-making following 49 hours of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A138.

48. **Killgore, WD,** McBride, SA, Killgore, DB, & Balkin, TJ. Stimulant countermeasures and risk propensity across 2 nights of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A136.

49. McBride, SA, Balkin, TJ, & **Killgore, WD.** The effects of 24 hours of sleep deprivation on odor identification accuracy [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A137.

50. Picchioni, D, **Killgore, WD,** Braun, AR, & Balkin, TJ. PET correlates of EEG activity during non-REM sleep. Poster presentation at the annual UCLA/Websciences Sleep Training Workshop, Lake Arrowhead, CA, September, 2005.

51. **Killgore, WD,** Killgore, DB, McBride, SA, & Balkin, TJ. Sustained verbal fluency following sleep deprivation and recovery sleep: The effects of caffeine, modafinil, and dextroamphetamine. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.

52. **Killgore, WD,** Balkin, TJ, & Wesensten, NJ. Decision-making is impaired following 2-days of sleep deprivation. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.

53. **Killgore, WD,** & Yurgelun-Todd, DA. Neural correlates of emotional intelligence in adolescent children. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.

54. **Killgore, WD,** & Yurgelun-Todd, DA. Social anxiety predicts amygdala activation in adolescents viewing fearful faces. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.

55. McBride, SA & **Killgore, WD.** Sleepy people smell worse: Olfactory deficits following extended

wakefulness. Paper presented at the Workshop on Trace Gas Detection Using Artificial, Biological, and Computational Olfaction. Monell Chemical Senses Center, Philadelphia, PA, March 29-31, 2006.

56. **Killgore, WD,** Day LM, Li, C, Kamimori, GH, Balkin, TJ, & Killgore DB. Moral reasoning is affected by sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A137.

57. **Killgore, WD,** Killgore DB, Kahn-Green, E, Conrad, A, Balkin, TJ, & Kamimori, G. H. Introversion-Extroversion predicts resilience to sleep loss [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A137.

58. Newman, R, Kamimori, GH, **Killgore, WD.** Sleep deprivation diminishes constructive thinking [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A136-137.

59. Huck, NO, Kendall, AP, McBride, SA, **Killgore, WD.** The perception of facial emotion is enhanced by psychostimulants following two nights of sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A136.

60. O'Sullivan, M, Reichardt, RM, Krugler, AL, Killgore, DB, & **Killgore, WD.** Premorbid intelligence correlates with duration and quality of recovery sleep following sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A372.

61. McBride, SA, **Killgore, WD,** Kahn-Green, E, Conrad, A, & Kamimori, GH. Caffeine administered to maintain overnight alertness does not disrupt performance during the daytime withdrawal period [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A136.

62. McBride, SA, Killgore DB, Balkin, TJ, Kamimori, GH, & **Killgore, WD.** Sleepy people smell worse: Olfactory decrements as a function of sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A135.

63. Day, LM, Li, C, Killgore, DB, Kamimori, GH, & **Killgore, WD.** Emotional intelligence moderates the effect of sleep deprivation on moral reasoning [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A135.

64. Murray, CJ, Killgore, DB, Kamimori, GH, & **Killgore, WD.** Individual differences in stress management capacity predict responsiveness to caffeine during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A43.

65. Murray, CJ, Newman, R, O'Sullivan, M, Killgore, DB, Balkin, TJ, & **Killgore, WD.** Caffeine, dextroamphetamine, and modafinil fail to restore Stroop performance during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A370-371.

66. Richards, J, Killgore, DB, & **Killgore, WD.** The effect of 44 hours of sleep deprivation on mood using the Visual Analog Mood Scales [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A132.

67. Richards, J, & **Killgore, WD.** The effect of caffeine, dextroamphetamine, and modafinil on alertness and mood during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A43.

68. Lipizzi, EL, Leavitt, BP, Killgore, DB, Kamimori, GH, & **Killgore, WD.** Decision making capabilities decline with increasing duration of wakefulness [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A131.

69. Lipizzi, EL, Killgore, DB, Kahn-Green, E, Kamimori, GH, & **Killgore, WD.** Emotional intelligence scores decline during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A131.

70. Kahn-Green, E, Day, L, Conrad, A, Leavitt, BP, Killgore, DB, & **Killgore, WD.** Short-term vs. long-term planning abilities: Differential effects of stimulants on executive function in sleep deprived individuals [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A370.

71. Kahn-Green, E, Conrad, A, Killgore, DB, Kamimori, GH, & **Killgore, WD.** Tired and frustrated: Using a projective technique for assessing responses to stress during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A130.

72. Killgore, DB, Kahn-Green, E, Balkin, TJ, Kamimori, GH, & **Killgore, WD.** 56 hours of wakefulness is associated with a sub-clinical increase in symptoms of psychopathology [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A130.

73. Killgore, DB, McBride, SA, Balkin, TJ, Leavitt, BP, & **Killgore, WD.** Modafinil improves humor appreciation during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A42.

74. Reichardt, RM, Killgore, DB, Lipizzi, EL, Li, CJ, Krugler, AL, & **Killgore, WD.** The effects of stimulants on recovery sleep and post-recovery verbal performance following 61-hours of sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A42.

75. Bailey, JD, Richards, J, & **Killgore, WD.** Prediction of mood fluctuations during sleep deprivation with the SAFTE Model [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A60.

76. Kendall, AP, McBride, S. A, & **Killgore, WD.** Visuospatial perception of line orientation is resistant to one night of sleep loss [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A369.

77. Kendall, AP, McBride, SA, Kamimori, GH, & **Killgore, WD.** The interaction of coping skills and stimulants on sustaining vigilance: Poor coping may keep yoiu up at night [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A129.

78. Muckle, A, Killgore, DB, & **Killgore, WD.** Gender differences in the effects of stimulant medications on the ability to estimate unknown quantities when sleep deprived [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A369.

79. Krugler, AL, **Killgore, WD,** & Kamimori, G. H. Trait anger predicts resistance to sleep loss [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A129.

80. **Killgore, WD,** Cotting, DI, Vo, A. H, Castro, CA, & Hoge, CW. The invincibility syndrome: Combat experiences predict risk-taking propensity following redeployment [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.

81. **Killgore, WD,** Wesensten, NJ, & Balkin, TJ. Stimulants improve tactical but not strategic planning during prolonged wakefulness [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.

82. **Killgore, WD,** Balkin, TJ, Wesensten, NJ, & Kamimori, G. H. The effects of sleep loss and caffeine on decision-making [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.

83. **Killgore, WD,** Balkin, TJ, & Kamimori, GH. Sleep loss can impair moral judgment [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.

84. **Killgore, WD,** Lipizzi, EL, Reichardt, RM, Kamimori, GH, & Balkin, TJ. Can stimulants reverse the effects of sleep deprivation on risky decision-making [abstract]? Abstract presented at the 25th Army Science Conference, Orlando, FL, November 27-30, 2006.

85. **Killgore, WD,** Killgore, DB, Kamimori, GH, & Balkin, TJ. Sleep deprivation impairs the emotional intelligence and moral judgment capacities of Soldiers [abstract]. Abstract presented at the 25th Army Science Conference, Orlando, FL, November 27-30, 2006.

86. **Killgore, WD,** Cotting, DI, Vo, AH, Castro, C.A, & Hoge, CW. The post-combat invincibility syndrome: Combat experiences increase risk-taking propensity following deployment [abstract]. Abstract presented at the 25th Army Science Conference, Orlando, FL, November 27-30, 2006.

87. Adam, GE, Szelenyi, ER, **Killgore, WD,** & Lieberman, HR. A double-blind study of two days of caloric deprivation: Effects on judgment and decision-making. Oral paper presentation at the Annual Scientific Meeting of the Aerospace Medical Association, New Orleans, LA, May, 2007.

88. Killgore, DB, Kahn-Greene, ET, Kamimori, GH, & **Killgore, WD.** The effects of acute caffeine withdrawal on short category test performance in sleep deprived individuals [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A43.

89. Richards, JM, Lipizzi, EL, Kamimori, GH, & **Killgore, WD.** Extroversion predicts change in attentional lapses during sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A137.

90. Lipizzi, EL, Richards, JM, Balkin, TJ, Grugle, NL, & **Killgore, WD.** Morningness-Eveningness and Intelligence [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A345.

91. Lipizzi, EL, Richards, JM, Balkin, TJ, Grugle, NL, & **Killgore WD.** Morningness-Eveningness affects risk-taking propensity during sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A136.

92. McBride, SA, Ganesan, G, Kamimori, GH, & **Killgore, WD.** Odor identification ability predicts vulnerability to attentional lapses during 77 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A135.

93. Smith, KL, McBride, S. A, Kamimori, GH, & **Killgore, WD.** Individual differences in odor discrimination predict mood dysregulation following 56 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A136.

94. McBride, SA, Leavitt, BP, Kamimori, GH, & **Killgore, WD.** Odor identification accuracy predicts resistance to sleep loss. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A137.

95. Killgore, DB, McBride, SA, Balkin, TJ, Grugle, NL. & **Killgore, WD.** Changes in odor discrimination predict executive function deficits following 45 hours of wakefulness [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A136.

96. Rupp, TL, Killgore, DB, Balkin, TJ, Grugle, NL, & **Killgore, WD.** The effects of modafinil, dextroamphetamine, and caffeine on verbal and nonverbal fluency in sleep deprived individuals [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A43.

97. Newman, RA, Krugler, AL, Kamimori, GH, & **Killgore, WD.** Changes in state and trait anger following 56 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A138.

98. Rupp, TL, Grugle, NL, Krugler, AL, Balkin, TJ, & **Killgore, WD.** Caffeine, dextroamphetamine, and modafinil improve PVT performance after sleep deprivation and recovery sleep [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A44.

99. **Killgore, WD,** Lipizzi, EL, Balkin, TJ, Grugle, NL, & Killgore, DB. The effects of sleep deprivation and stimulants on self-reported sensation seeking propensity [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A42.

100. **Killgore, WD,** Richards, JM, Balkin, TJ, Grugle, NL, & Killgore DB. The effects of sleep deprivation and stimulants on risky behavior [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A41.

101. Newman, RA, Smith, KL, Balkin, TJ, Grugle, NL, & **Killgore, WD.** The effects of caffeine, dextroamphetamine, and modafinil on executive functioning following 45 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A45.

102. Richards, JM, Lipizzi, EL, Balkin, TJ, Grugle, NL, & **Killgore, WD.** Objective alertness predicts mood changes during 44 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A56.

103. **Killgore, WD,** & Yurgelun-Todd, DA. Cortical and Limbic Activation in Response to Visual Images of Low and High-Caloric Food [abstract]. Oral symposium presented at the 6th Annual Conference of the Society of Behavioral Nutrition and Physical Activity (ISBNPA), Oslo, Norway, June 20-23, 2007. Proceedings of the ISBNPA, 2007, 75.

104. Estrada, A, **Killgore, WD,** Rouse, T, Balkin, TJ, & Wildzunas, RM. Total sleep time measured by actigraphy predicts academic performance during military training [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A134.

105. **Killgore, WD,** Lipizzi, EL, Smith, KL, Killgore, DB, Rupp, TL, Kamimori, GH, & Balkin, T. J. Nonverbal intelligence is inversely related to the ability to resist sleep loss [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A134.

106. **Killgore, WD,** Lipizzi, EL, Killgore, DB, Rupp, TL, Kamimori, GH, & Balkin, TJ. Emotional intelligence predicts declines in emotion-based decision-making following sleep deprivation [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A134.

107. Reid, CT, Smith, K, **Killgore, WD,** Rupp, TL, & Balkin, TJ. Higher intelligence is associated with less subjective sleepiness during sleep restriction [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A375.

108. Newman, R, **Killgore, WD,** Rupp, T. L, & Balkin, TJ. Better baseline olfactory discrimination is associated with worse PVT and MWT performance with sleep restriction and recovery [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A375.

109. Smith, KL, Reid, CT, **Killgore, WD,** Rupp, TL, & Balkin, TJ. Personality factors associated with performance and sleepiness during sleep restriction and recovery [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A376.

110. Lipizzi, EL, **Killgore, WD,** Rupp, TL, & Balkin, TJ. Risk-taking behavior is elevated during recovery from sleep restriction [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A376.

111. Lipizzi, EL, Rupp, TL, **Killgore, WD,** & Balkin, TJ. Sleep restriction increases risk-taking behavior [abstract]. Poster presented at the 11th Annual Force Health Protection Conference, Albuquerque, NM, August, 9-15, 2008.

112. **Killgore, WD,** Estrada, A, Balkin, TJ, & Wildzunas, RM. Sleep duration during army training predicts course performance [abstract]. Poster presented at the 11th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.

113. **Killgore, WD,** Lipizzi, EL, Smith, KL, Killgore, DB, Rupp, TL, Kamimori, GH, & Balkin, TJ. Higher cognitive ability is associated with reduced relative resistance to sleep loss [abstract]. Poster presented at the 11th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.

114. **Killgore, WD,** Rupp, TL, Grugle, NL, Lipizzi, EL, & Balkin, TJ. Maintaining alertness during sustained operations: Which stimulant is most effective after 44 hours without sleep [abstract]? Poster presented at the 11th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.

115. **Killgore, WD,** Newman, RA, Lipizzi, EL, Kamimori, GH, & Balkin, TJ. Sleep deprivation increases feelings of anger but reduces verbal and physical aggression in Soldiers [abstract]. Poster presented at the 11th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.

116. Kelley, AM, Dretsch, M, **Killgore, WD,** & Athy, JR. Risky behaviors and attitudes about risk in Soldiers. Abstract presented at the 29th Annual Meeting of the Society for Judgment and Decision Making, Chicago, IL, November, 2008.

117. **Killgore, WD,** Ross, AJ, Silveri, MM, Gruber, SA, Kamiya, T, Kawada, Y, Renshaw, PF, & Yurgelun-Todd, DA. Citicoline affects appetite and cortico-limbic responses to images of high calorie foods. Abstract presented at the Society for Neuroscience, Washington DC, November 19, 2008.

118. Britton, JC, Stewart, SE, Price, LM, **Killgore, WD,** Gold, AL, Jenike, MA, & Rauch, SL. Reduced amygdalar activation in response to emotional faces in pediatric Obsessive-Compulsive Disorder. Abstract presented at the Annual meeting of the American College of Neuropsychopharmacology, Scottsdale, AZ, December 7-11, 2008.

119. **Killgore, WD,** Balkin, TJ, Estrada, A, & Wildzunas, RM. Sleep and performance measures in soldiers undergoing military relevant training. Abstract presented at the 26th Army Science Conference, Orlando, FL, December 1-4, 2008.

120. **Killgore, WD** & Yurgelun-Todd, DA. Cerebral correlates of amygdala responses during non-conscious perception of affective faces in adolescent children. Abstract presented at the 37th Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.

121. **Killgore, WD,** Killgore, DB, Grugle, NL, & Balkin, TJ. Odor identification ability predicts executive function deficits following sleep deprivation. Abstract presented the 37th Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.

122. **Killgore, WD,** Rupp, TL, Killgore, DB, Grugle, NL, and Balkin, TJ. Differential effects of stimulant

medications on verbal and nonverbal fluency during sleep deprivation. Abstract presented the 37th Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.

123. **Killgore, WD,** Killgore, DB, Kamimori, GH, & Balkin, TJ. When being smart is a liability: More intelligent individuals may be less resistant to sleep deprivation. Abstract presented the 37th Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.

124. **Killgore, WD,** Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Introversion is associated with greater amygdala and insula activation during viewing of masked affective stimuli. Abstract presented the 37th Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.

125. **Killgore, WD,** Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Amygdala responses of specific animal phobics do not differ from healthy controls during masked fearful face perception. Abstract presented the 37th Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.

126. **Killgore, WD,** Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Small animal phobics show sustained amygdala activation in response to masked happy facial expressions. Abstract presented the 37th Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009. ***[*Merit Poster Award]***

127. Price, LM, **Killgore, WD,** Britton, JC, Kaufman, ML, Gold, AL, Deckersbach, T, & Rauch, SL. Anxiety sensitivity correlates with insula activation in response to masked fearful faces in specific animal phobics and healthy subjects. Abstract presented at the Annual Conference of the Anxiety Disorders Association of America, Santa Ana Pueblo, New Mexico, March 12-15, 2009.

128. **Killgore, WD,** Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Neuroticism is inversely correlated with amygdala and insula activation during masked presentations of affective stimuli. Abstract presented at the Annual Conference of the Anxiety Disorders Association of America, Santa Ana Pueblo, New Mexico, March 12-15, 2009.

129. **Killgore, WD,** Kelley, AM, & Balkin, TJ. Development and validation of a scale to measure the perception of invincibility. Abstract presented at the Annual Conference of the Anxiety Disorders Association of America, Santa Ana Pueblo, New Mexico, March 12-15, 2009.

130. Kelly, AM, **Killgore WD,** Athy, J, & Dretsch, M. Risk propensity, risk perception, risk aversion, and sensation seeking in U.S. Army soldiers. Abstract presented at the 80th Annual Scientific Meeting of the Aerospace Medical Association, Los Angeles, CA, May 3-7, 2009.

131. Britton, JC, Stewart, SE, Price, LM, **Killgore, WD,** Jenike, MA, & Rauch, SL. The neural correlates of negative priming in pediatric obsessive-compulsive disorder (OCD). Abstract presented at the 64th Annual Scientific Meeting of the Society of Biological Psychiatry, Vancouver, Canada, May 14-16, 2009.

132. **Killgore, WD,** Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine protects against increased risk-taking behavior during severe sleep deprivation. Abstract presented at the 23rd Annual Meeting of the Associated Professional Sleep Societies, Seattle, Washington, June 7-12, 2009.

133. Killgore, DB, **Killgore, WD,** Grugle, NL, & Balkin, TJ. Executive functions predict the ability to sustain psychomotor vigilance during sleep loss. Abstract presented at the 23rd Annual Meeting of the Associated

Professional Sleep Societies, Seattle, Washington, June 7-12, 2009.

134. **Killgore, WD,** & Yurgelun-Todd, DA. Trouble falling asleep is associated with reduced activation of dorsolateral prefrontal cortex during a simple attention task. Abstract presented at the 23rd Annual Meeting of the Associated Professional Sleep Societies, Seattle, Washington, June 7-12, 2009.

135. **Killgore, WD,** Kelley, AM, & Balkin, TJ. A new scale for measuring the perception of invincibility. Abstract presented at the 12th Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.

136. **Killgore, WD,** Killgore, DB, Grugle, NL, & Balkin, TJ. Executive functions contribute to the ability to resist sleep loss. Abstract presented at the 12th Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.

137. **Killgore, WD,** Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine reduces risk-taking behavior during severe sleep deprivation. Abstract presented at the 12th Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009. ***[*Winner Best Paper Award: Research]***

138. **Killgore, WD,** Castro, CA, & Hoge, CW. Normative data for the Evaluation of Risks Scale—Bubble Sheet Version (EVAR-B) for large scale surveys of returning combat veterans. Abstract presented at the 12th Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.

139. **Killgore, WD,** Castro, CA, & Hoge, CW. Combat exposure and post-deployment risky behavior. Abstract presented at the 12th Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.

140. **Killgore, WD**, Price, LM, Britton, JC, Simon, N, Pollack, MH, Weiner, MR, Schwab, ZJ, Rosso, IM, & Rauch, SL. Paralimbic responses to masked emotional faces in PTSD: Disorder and valence specificity. Abstract presented at the Annual McLean Hospital Research Day, January 29, 2010.

141. **Killgore, WD**, Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine minimizes behavioral risk-taking during 75 hours of sleep deprivation. Abstract presented at the 38th Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

142. **Killgore, WD** & Balkin, TJ. Vulnerability to sleep loss is affected by baseline executive function capacity. Abstract presented at the 38th Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

143. **Killgore, WD**, Smith, KL, Reichardt, RM., Killgore, DB, & Balkin, TJ. Intellectual capacity is related to REM sleep following sleep deprivation. Abstract presented at the 38th Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

144. **Killgore, WD** & Yurgelun-Todd, DA. Cerebral correlates of amygdala responses to masked fear, anger, and happiness in adolescent and pre-adolescent children. Abstract presented at the 38th Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

145. **Killgore, WD**, Post, A, & Yurgelun-Todd, DA. Sex differences in cortico-limbic responses to images of high calorie food. Abstract presented at the 38th Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

146. **Killgore, WD** & Yurgelun-Todd, DA. Self-reported insomnia is associated with increased activation within the default-mode network during a simple attention task. Abstract presented at the 38th Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

147. **Killgore, WD**, Price, LM, Britton, JC, Gold, AL, Deckersbach, T, & Rauch, SL. Neural correlates of anxiety sensitivity factors during presentation of masked fearful faces. Abstract presented at the 38th Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

148. **Killgore, WD**, Grugle, NL, Conrad, TA, & Balkin, TJ. Baseline executive function abilities predict risky behavior following sleep deprivation. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

149. **Killgore, WD**, Grugle, NL, & Balkin, TJ. Judgment of objective vigilance performance is affected by sleep deprivation and stimulants. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

150. Killgore, DB, **Killgore, WD**, Grugle, NL, & Balkin, TJ. Resistance to sleep loss and its relationship to decision making during sleep deprivation. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

151. Killgore DB, **Killgore, WD**, Grugle, NL, & Balkin, TJ. Subjective sleepiness and objective performance: Differential effects of stimulants during sleep deprivation. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

152. Rupp, TL, **Killgore, WD**, & Balkin, TJ. Vulnerability to sleep deprivation is differentially mediated by social exposure in extraverts vs. introverts. Oral presentation at the "Data Blitz" section at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

153. Rupp, TL, **Killgore, WD**, & Balkin, TJ. Extraverts may be more vulnerable than introverts to sleep deprivation on some measures of risk-taking and executive functioning. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

154. Rupp, TL, **Killgore, WD**, & Balkin, TJ. Vulnerability to sleep deprivation is differentially mediated by social exposure in extraverts vs. introverts. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

155. Capaldi, VF, Guerrero, ML, & **Killgore, WD**. Sleep disorders among OIF and OEF Soldiers. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.

156. **Killgore, WD**, Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine reduces behavioral risk-taking during sleep deprivation. Abstract presented at the 65th Annual Meeting of the Society for Biological Psychiatry, New Orleans, Louisiana, May 20-22, 2010.

157. **Killgore, WD**, Price, LM, Britton, JC, Simon, N, Pollack, MH, Weiner, MR, Schwab, ZJ, Rosso, IM, & Rauch, SL. Paralimbic responses to masked emotional faces in PTSD: Disorder and valence specificity. Abstract presented at the 65th Annual Meeting of the Society for Biological Psychiatry, New Orleans, Louisiana, May 20-22, 2010.

158. Rosso, IM, Makris, N, Britton, JC, Price, LM, Gold, AL, Deckersbach, T, **Killgore, WD**, & Rauch SL.

Anxiety sensitivity correlates with insular cortex volume and thickness in specific animal phobia. Abstract presented at the 65th Annual Meeting of the Society for Biological Psychiatry, New Orleans, Louisiana, May 20-22, 2010.

159. Rupp, TL, **Killgore, WD**, & Balkin, TJ. Vulnerability to sleep deprivation is mediated by social exposure in extraverts versus introverts. Oral platform presentation at the 20th Congress of the European Sleep Research Society, Lisbon, Portugal, September 14-18, 2010.

160. **Killgore, WD**, Estrada, A, & Balkin, TJ. A tool for monitoring soldier fatigue and predicting cognitive readiness: The Sleep History and Readiness Predictor (SHARP). Abstract presented at the 27th Army Science Conference, Orlando, FL, November 29-December 2, 2010.

161. **Killgore, WD**, Kamimori, GH, & Balkin, TJ. Caffeinated gum minimizes risk-taking in soldiers during prolonged sleep deprivation. Abstract presented at the 27th Army Science Conference, Orlando, FL, November 29-December 2, 2010.

162. **Killgore, WD**, Britton, JC, Schwab, ZJ, Weiner, MR, Rosso, IM, & Rauch, SL. Exaggerated amygdala responses to masked fearful faces are specific to PTSD versus simple phobia. Oral platform presentation at the 27th Army Science Conference, Orlando, FL, November 29-December 2, 2010. ***[*Winner Best Paper in Neuroscience]***

163. **Killgore, WD**, Kamimori, GH, & Balkin, TJ. Sleep deprivation selectively impairs emotional aspects of cognitive functioning. Oral platform presentation at the 27th Army Science Conference, Orlando, FL, November 29-December 2, 2010.

164. Rupp, TL, **Killgore, WD**, & Balkin, TJ. Evaluation of personality and social exposure as individual difference factors influencing response to sleep deprivation. Oral platform presentation at the 27th Army Science Conference, Orlando, FL, November 29-December 2, 2010.

165. **Killgore, WD**, Britton, JC, Rosso, IM, Schwab, ZJ, Weiner, MR, & Rauch, SL. Shared and differential patterns of amygdalo-cortical activation across anxiety disorders. Abstract presented at the 49th Annual Meeting of the American College of Neuropsychopharmacology, Miami Beach, FL, December 5-9, 2010.

166. Rosso, IM, **Killgore, WD**, Britton, JC, Weiner, MR, Schwab, ZJ, & Rauch, SL. Neural correlates of PTSD symptom dimensions during emotional processing: A functional magnetic resonance imaging study. Abstract presented at the 49th Annual Meeting of the American College of Neuropsychopharmacology, Miami Beach, FL, December 5-9, 2010.

167. **Killgore, WD,** Rosso, IM, Britton, JC, Schwab, ZJ, Weiner, MR, & Rauch, SL. Cortico-limbic activation differentiates among anxiety disorders with and without a generalized threat response. Abstract presented at the McLean Hospital Research Day, January 13, 2011.

168. Weiner, MR, Schwab, ZJ, Rauch, SL, & **Killgore WD**. Personality factors predict brain responses to images of high-calorie foods. Abstract presented at the McLean Hospital Research Day, January 13, 2011.

169. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WD.** Emotional and cognitive intelligence: Support for the neural efficiency hypothesis. Abstract presented at the McLean Hospital Research Day, January 13, 2011.

170. Crowley, DJ, Covell, MJ, **Killgore, WD**, Schwab, ZJ, Weiner, MR, Acharya, D, Rosso, IM, & Silveri,

MM. Differential influence of facial expression on inhibitory capacity in adolescents versus adults. Abstract presented at the McLean Hospital Research Day, January 13, 2011.

171. **Killgore, WD**, Britton, JC, Rosso, IM, Schwab, ZJ, Weiner, MR, & Rauch, SL. Similarities and differences in cortico-limbic responses to masked affect probes across anxiety disorders. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

172. Rosso, IM, **Killgore, WD**, Britton, JC, Weiner, MR, Schwab, ZJ, & Rauch, SL. Hyperarousal and reexperiencing symptoms of post-traumatic stress disorder are differentially associated with limbic-prefrontal brain responses to threatening stimuli. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

173. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WD**. Neural correlates of cognitive and emotional intelligence in adults. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

174. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WD**. Cognitive and emotional intelligences: Are they distinct or related constructs? Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

175. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WD**. Discrepancy scores between cognitive and emotional intelligence predict neural responses to affective stimuli. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

176. **Killgore, WD**, Schwab, ZJ, Weiner, MR, & Rauch, SL. Smart people go with their gut: Emotional intelligence correlates with non-conscious insular responses to facial trustworthiness. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

177. **Killgore, WD**, Weiner, MR, Schwab, ZJ, & Rauch, SL. Whom can you trust? Neural correlates of subliminal perception of facial trustworthiness. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

178. Weiner, MR, Schwab, ZJ, & Rauch, SL, **Killgore, WD**. Impulsiveness predicts responses of brain reward circuitry to high-calorie foods. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

179. Weiner, MR, Schwab, ZJ, & Rauch, SL, **Killgore, WD**. Conscientiousness predicts brain responses to images of high-calorie foods. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

180. Crowley, DJ, Covell, MJ, **Killgore, WD**, Schwab, ZJ, Weiner, MR, Acharya, D, Rosso, IM, & Silveri, MM. Differential influence of facial expression on inhibitory capacity in adolescents versus adults. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

181. Gruber, SA, Dahlgren, MK, **Killgore, WD**, Sagar, KA, & Racine, MT. Marijuana: Age of onset of use impacts executive function and brain activation. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

182. **Killgore, WD,** Conrad, TA, Grugle, NL, & Balkin, TJ. Baseline executive function abilities correlate with risky behavior following sleep deprivation. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

183. **Killgore, WD,** Grugle, NL, Killgore, DB, & Balkin, TJ. Resistance to sleep loss and decision making during sleep deprivation. Abstract presented at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

184. **Killgore, WD,** Rosso, IM, Britton, JC, Schwab, ZJ, Weiner, MR, & Rauch, SL. Cortico-limbic activation differentiates among anxiety disorders with and without a generalized threat response. Abstract presented at the 66th Annual Meeting of the Society for Biological Psychiatry, San Francisco, CA, May 12-14, 2011. ***[*Blue Ribbon Finalist: Clinical/Translational]***

185. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WD.** Emotional and cognitive intelligence: Support for the neural efficiency hypothesis. Abstract presented at the 66th Annual Meeting of the Society for Biological Psychiatry, San Francisco, CA, May 12-14, 2011.

186. Weiner, MR, Schwab, ZJ, Rauch, SL, & **Killgore WD**. Personality factors predict brain responses to images of high-calorie foods. Abstract presented at the 66th Annual Meeting of the Society for Biological Psychiatry, San Francisco, CA, May 12-14, 2011.

187. **Killgore, WD,** Grugle, NL, & Balkin, TJ. Sleep deprivation impairs recognition of specific emotions. Abstract presented at the 25th Annual Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 11-15, 2011.

188. **Killgore, WD,** & Balkin, TJ. Does vulnerability to sleep deprivation influence the effectiveness of stimulants on psychomotor vigilance? Abstract presented at the 25th Annual Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 11-15, 2011.

189. Killgore, DB, **Killgore, WD,** Grugle, NJ, & Balkin, TJ. Sleep deprivation impairs recognition of specific emotions. Abstract presented at the 25th Annual Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 11-15, 2011.

190. Weiner, MR, Schwab, ZJ, & **Killgore, WD.** Daytime sleepiness is associated with altered brain activation during visual perception of high-calorie foods: An fMRI study. Abstract presented at the 25th Annual Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 11-15, 2011.

191. Schwab, ZJ, Weiner, MR, & **Killgore, WD.** Functional MRI correlates of morningness-eveningness during visual presentation of high calorie foods. Abstract presented at the 25th Annual Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 11-15, 2011.

192. **Killgore, WD,** Weiner, MR, & Schwab, ZJ. Daytime sleepiness affects prefrontal regulation of food intake. Abstract presented at the McLean Hospital Research Day, January 11, 2012.

193. Kipman, M, Schwab ZJ, Weiner, MR, DelDonno, S, Rauch SL, & **Killgore WD**. The insightful yet bitter comedian: The role of emotional versus cognitive intelligence in humor appreciation. Abstract presented at the McLean Hospital Research Day, January 11, 2012.

194. Weber, M, & **Killgore, WD**. Gray matter correlates of emotional intelligence. Abstract presented at the

McLean Hospital Research Day, January 11, 2012.

195. Schwab, ZJ, & **Killgore, WD**. Sex differences in functional brain responses to food. Abstract presented at the McLean Hospital Research Day, January 11, 2012.

196. DelDonno, S, Schwab, ZJ, Kipman M, Rauch, SL, & **Killgore, WD**. The influence of cognitive and emotional intelligence on performance on the Iowa Gambling Task. Abstract presented at the McLean Hospital Research Day, January 11, 2012.

197. Song, CH, Kizielewicz, J, Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WD**. Time is of the essence: The Design Organization Test as a valid, reliable, and brief measure of visuospatial ability. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

198. Kipman, M, Schwab, ZJ, DelDonno, S, & **Killgore, WD**. Gender differences in the contribution of cognitive and emotional intelligence to the left visual field bias for facial perception. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

199. Kipman, M., Schwab, ZJ, Weiner, MR, DelDonno, S, Rauch, SL, & **Killgore, WD**. Contributions of emotional versus cognitive intelligence in humor appreciation. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

200. Schwab, ZJ, & **Killgore, WD**. Disentangling emotional and cognitive intelligence. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

201. Schwab, ZJ, & **Killgore, WD**. Sex differences in functional brain responses to food. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

202. DelDonno, S, Schwab, ZJ, Kipman, M, Rauch, SL, & **Killgore, WD**. The influence of cognitive and emotional intelligence on performance on the Iowa Gambling Task. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

203. **Killgore, WD**, Britton, JC, Rosso, IM, Schwab, ZJ, Weiner, MR, & Rauch, SL. Shared and unique patterns of cortico-limbic activation across anxiety disorders. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

204. **Killgore, WD**, & Balkin, TJ. Sleep deprivation degrades recognition of specific emotions. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

205. **Killgore, WD**, & Schwab, ZJ. Emotional intelligence correlates with somatic marker circuitry responses to subliminal cues of facial trustworthiness. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

206. **Killgore, WD**, & Schwab, ZJ. Trust me! Neural correlates of the ability to identify facial trustworthiness. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

207. **Killgore, WD**, Schwab, ZJ, Weiner, MR, Kipman, M, DelDonno, S, & Rauch SL. Overeating is associated with altered cortico-limbic responses to images of high calorie foods. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

208. **Killgore, WD**, Weiner, MR, & Schwab, ZJ. Daytime sleepiness affects prefrontal regulation of food intake. Abstract presented at the 40th Annual Meeting of the International Neuropsychological Society, Montreal, CA, February 15-18, 2012.

209. Weber, M, DelDonno, S, Kipman M, Schwab, ZJ, & **Killgore WD**. Grey matter correlates of self-reported sleep duration. Abstract presented at the Harvard Medical School Research Day, Boston, MA, March 28, 2012.

210. **Killgore, WD**. Overlapping and distinct patterns of neurocircuitry across PTSD, Panic Disorder, and Simple Phobia. Abstract presented at the 32nd Annual Conference of the Anxiety Disorders Association of America, Arlington, VA, April 12-15, 2012.

211. **Killgore, WD**, Britton, JC, Rosso, IM, Schwab, ZJ, & Rauch, SL. Shared and unique patterns of cortico-limbic activation across anxiety disorders. Abstract presented at the 67th Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 3-5, 2012.

212. **Killgore, WD**, Schwab, ZJ, & Rauch, SL. Daytime sleepiness affects prefrontal inhibition of food consumption. Abstract presented at the 67th Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 3-5, 2012.

213. Rosso, IM, Britton, JC, Makris, N, **Killgore, WD**, Rauch SL, & Stewart ES. Impact of major depression comorbidity on prefrontal and anterior cingulate volumes in pediatric OCD. Abstract presented at the 67th Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 3-5, 2012.

214. Kipman, M, Weber, M, DelDonno, S., Schwab, ZJ, & **Killgore, WD**. Morningness-Eveningness correlates with orbitofrontal gray matter volume. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

215. Kipman, M, Schwab, ZJ, Weber, M, DelDonno, S, & **Killgore, WD**. Yawning frequency is correlated with reduced medial thalamic volume. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

216. Weber, M, DelDonno, S, Kipman M, Schwab, ZJ, & **Killgore WD**. Grey matter correlates of daytime sleepiness. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

217. Weber, M, DelDonno, S, Kipman M, Schwab, ZJ, & **Killgore WD**. Grey matter correlates of self-reported sleep duration. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

218. DelDonno, S, Weber, M, Kipman M, Schwab, ZJ, & **Killgore, WD**. Resistance to insufficient sleep correlates with olfactory cortex gray matter. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

219. DelDonno, S, Schwab, ZJ, Kipman, M, Weber, M, & **Killgore, WD**. Weekend sleep is related to greater

coping and resilience capacities. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

220. Schwab, ZJ, DelDonno, S, Weber, M, Kipman M, & **Killgore, WD**. Habitual caffeine consumption and cerebral gray matter volume. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

221. Schwab, ZJ, & **Killgore, WD**. Daytime sleepiness affects prefrontal regulation of food intake. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

222. **Killgore, WD**, Schwab, ZJ, DelDonno S, Kipman, M, Weber M, & Rauch, SL. Greater nocturnal sleep time is associated with increased default mode functional connectivity. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

223. **Killgore, WD**, Kamimori, GH, & Balkin, TJ. Caffeine improves efficiency of planning and sequencing abilities during sleep deprivation. Abstract presented at the 26th Annual Meeting of the Associated Professional Sleep Societies, Boston, MA, June 9-13, 2012.

224. Sneider, JT, **Killgore, WD**, Crowley, DJ, Cohen-Gilbert, JE, Schwab, ZJ, & Silveri, MM. Inhibitory capacity in emerging adult binge drinkers: Influence of Facial Cues. Abstract presented at the 35th Annual Scientific Meeting of the Research Society on Alcoholism, San Francisco, CA, June 23-27, 2012.

225. **Killgore WD**. Multimodal neuroimaging to predict cognitive resilience against sleep loss. Abstract presented at the DARPA Young Faculty Award 2012 Meeting, Arlington, VA, July 30-31, 2012. ***[*Winner Young Faculty Award in Neuroscience]***

226. Cohen-Gilbert, JE, **Killgore WD**, Crowley, DJ, Covell, MJ, Schwab, ZJ, Weiner, MR, Acharya, D, Sneider, JT, & Silveri, MM. Differential influence of safe versus threatening facial expressions on inhibitory control across adolescence and adulthood. Abstract presented at the Society for Neuroscience 2012 Meeting, New Orleans, LA, October 13-17, 2012.

227. Weber, M, DelDonno, S, Kipman M, Schwab, ZJ, & **Killgore WD**. Grey matter correlates of self-reported sleep duration. Abstract presented at the Harvard Division of Sleep Medicine Annual Poster Session, Boston, MA, September 27, 2012.

228. Weber, M, DelDonno, SR, Kipman, M, Preer, LA, Schwab ZJ, Weiner, MR, & **Killgore, WD.** The effect of morning bight light therapy on sleep, cognition and emotion following mild traumatic brain injury. Abstract presented at the 2012 Sleep Research Network Meeting, 22-23 October 2012, Bethesda, MD.

229. Sneider, JT, **Killgore, WD**, Crowley, DJ, Cohen-Gilbert, JE, Schwab, ZJ, & Silveri, MM. Inhibitory capacity in emerging adult binge drinkers: Influence of Facial Cues. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

230. Cohen-Gilbert, JE, **Killgore WD**, Crowley, DJ, Covell, MJ, Schwab, ZJ, Weiner, MR, Acharya, D, Sneider, JT, & Silveri, MM. Differential influence of safe versus threatening facial expressions on inhibitory control across adolescence and adulthood. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

231. Tkachenko, O, Schwab, ZJ, Kipman, M, DelDonno, S, Gogel, H., Preer, L, & **Killgore, WD**. Smarter

women need less sleep. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

232. DelDonno, S, Kipman, M, Schwab, ZJ, & **Killgore, WD**. The contributions of emotional intelligence and facial perception to social intuition. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

233. Kipman, M, Schwab, ZJ, DelDonno, S, Weber, M, Rauch, SL, & **Killgore, WD**. The neurocircuitry of impulsive behavior. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

234. Preer, LA, Tkachenko, O, Gogel, H, Schwab, ZJ, Kipman, M, DelDonno, SR, Weber, M, Webb, CA, & **Killgore, WD**. Emotional intelligence as a mediator of the association between anxiety sensitivity and anxiety symptoms. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

235. Gogel, H, DelDonno, S, Kipman M, Preer, LA, Schwab, ZJ, Tkachenko, O, & **Killgore, WD**. Validation of the Design Organization Test (DOT) in a healthy population. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

236. Brennan, BP, Schwab, ZS, Athey, AJ, Ryan, EM, Pope, HG, **Killgore, WD**, Jenike, MA, & Rauch, SL. A functional magnetic resonance imaging study of rostral anterior cingulate cortex activation in obsessive-compulsive disorder using an emotional counting stroop paradigm. Abstract presented at the Annual McLean Hospital Research Day, January 16, 2013.

237. Cohen-Gilbert, JE, Schwab, ZJ, **Killgore, WD**, Crowley, DJ, & Silveri MM. Influence of Binge Drinking on the Neural Correlates of Inhibitory Control during Emotional Distraction in Young Adults. Abstract presented at the 3rd International Conference on Applications of Neuroimaging to Alcoholism (ICANA-3), New Haven, CT, February 15-18, 2013.

238. Weber, M, & **Killgore, WD**. The interrelationship between 'sleep credit', emotional intelligence and mental health – a voxel-based morphometric study. Abstract presented at Harvard Medical School Psychiatry Research Day, April 10, 2013.

239. Cohen-Gilbert, JE, Schwab, ZJ, **Killgore, WD**, Crowley, DJ, & Silveri MM. Influence of Binge Drinking on the Neural Correlates of Inhibitory Control during Emotional Distraction in Young Adults. Abstract presented at Harvard Medical School Psychiatry Research Day, April 10, 2013.

240. Mundy, EA, Weber, M, Rauch, SL, **Killgore, WD**, & Rosso, IM. The relationship between subjective stress levels in childhood and anxiety as well as perceived stress as an adult. Abstract presented at Harvard Medical School Psychiatry Research Day, April 10, 2013.

241. Webb, CA, **Killgore, WD**, Britton, JC, Schwab, ZJ, Price, LM, Weiner, MR, Gold, AL, Rosso, IM, Simon, NM, Pollack, MH, & Rauch, SL. Comparing categorical versus dimensional predictors of functional response across three anxiety disorders. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

242. Preer, LA, Tkachenko, O, Gogel, H, Schwab, ZJ, Kipman, M, DelDonno, SR, Weber, M, Webb, CA, Rauch, SL, & **Killgore, WD**. Linking Sleep Trouble to Neuroticism, Emotional Control, and Impulsiveness. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

243. Preer, LA, Tkachenko, O, Gogel, H, Schwab, ZJ, Kipman, M, DelDonno, SR, Weber, M, Webb, CA, Rauch, SL, & **Killgore, WD**. Emotional Intelligence as a Mediator of the Association between Anxiety Sensitivity and Anxiety Symptoms. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

244. Kipman, M, Schwab, ZJ, DelDonno, S, Weber, M, Rauch, SL, & **Killgore, WD**. The neurocircuitry of impulsive behavior. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

245. Weber, M, **Killgore, WD**, Rosso, IM, Britton, JC, Simon, NM, Pollack, MH, & Rauch, SL. Gray matter correlates of posttraumatic stress disorder—A voxel based morphometry study. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

246. Weber, M, Penetar, DM, Trksak, GH, DelDonno, SR, Kipman, M, Schwab, ZJ, & **Killgore, WD**. Morning blue wavelength light therapy improves sleep, cognition, emotion and brain function following mild traumatic brain injury. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

247. Tkachenko, O, Schwab, ZJ, Kipman, M, Preer, LA, Gogel, H, DelDonno, SR, Weber, M, Webb, CA, Rauch, SL, & **Killgore, WD**. Difficulty in falling asleep and staying asleep linked to a sub-clinical increase in symptoms of psychopathology. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

248. **Killgore, WD**, Schwab, ZJ, Kipman, M, DelDonno, SR, Rauch, SL, & Weber, M. Problems with sleep initiation and sleep maintenance correlate with functional connectivity among primary sensory cortices. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

249. **Killgore, WD**, Schwab, ZJ, Kipman, M, DelDonno, SR, Rauch, SL, & Weber, M. A Couple of Hours Can Make a Difference: Self-Reported Sleep Correlates with Prefrontal-Amygdala Connectivity and Emotional Functioning. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

250. Brennan, BP, Schwab, ZS, Athey, AJ, Ryan, EM, Pope, HG, **Killgore, WD**, Jenike, MA, & Rauch, SL. A functional magnetic resonance imaging study of rostral anterior cingulate cortex activation in obsessive-compulsive disorder using an emotional counting stroop paradigm. Abstract presented at the 68th Annual Meeting of the Society of Biological Psychiatry, San Francisco, CA, May 16-18, 2013.

251. Weber, M, & **Killgore, WD**. The interrelationship between 'sleep credit', emotional intelligence and mental health – a voxel-based morphometric study. Abstract presented at the SLEEP 2013 Annual Meeting, Baltimore, MD, June 1-5, 2013.

252. Weber, M, Penetar, DM, Trksak, GH, DelDonno, SR, Kipman, M, Schwab, ZJ, & **Killgore, WD**. Morning blue wavelength light therapy improves sleep, cognition, emotion and brain function following mild traumatic brain injury. Abstract presented at the SLEEP 2013 Annual Meeting, Baltimore, MD, June 1-5, 2013.

253. **Killgore, WD**, Schwab, ZJ, Kipman, M, DelDonno, SR, & Weber, M. Problems with Sleep Initiation and Sleep Maintenance Correlate with Functional Connectivity Among Primary Sensory Cortices. Abstract presented at the SLEEP 2013 Annual Meeting, Baltimore, MD, June 1-5, 2013.

254. **Killgore, WD**, Schwab, ZJ, Kipman, M, DelDonno, SR, & Weber, M. A Couple of Hours Can Make a Difference: Self-Reported Sleep Correlates with Prefrontal-Amygdala Connectivity and Emotional Functioning. Abstract presented at the SLEEP 2013 Annual Meeting, Baltimore, MD, June 1-5, 2013.

255. Tkachenko, O, Schwab, ZJ, Kipman, M, DelDonno, SR, Preer, LA, Gogel, H, Weber, M, Webb, CA, & **Killgore, WD**. Difficulty in falling asleep and staying asleep linked to a sub-clinical increase in symptoms of psychopathology. Abstract presented at the SLEEP 2013 Annual Meeting, Baltimore, MD, June 1-5, 2013.

256. Preer, LA, Tkachenko, O, Gogel, H, Schwab, ZJ, Kipman, M, DelDonno, SR, Weber, M, Webb, CA, & **Killgore, WD**. Linking Sleep Initiation Trouble to Neuroticism, Emotional Control, and Impulsiveness. Abstract presented at the SLEEP 2013 Annual Meeting, Baltimore, MD, June 1-5, 2013.

257. **Killgore, WD**. Sleep duration contributes to cortico-limbic functional connectivity, emotional functioning, & psychological health. Abstract presented at the 52nd Annual Meeting of the American College of Neuropsychopharmacology, Hollywood, FL, December 8-12, 2013.

258. Preer, L, Tkachenko, O, Gogel, H, Bark, JS, Kipman, M, Olson, EA, & **Killgore, WD**. The role of personality in sleep initiation problems. Abstract presented at the Annual McLean Hospital Research Day, January 22, 2014.

259. Demers, LA, Olson, EA, Weber, M, Divatia, S, Preer, L, & **Killgore, WD**. Paranoid traits are related to deficits in complex social decision-making and reduced superior temporal sulcus volume. Abstract presented at the Annual McLean Hospital Research Day, January 22, 2014.

260. Tkachenko, O, Weber, M, Gogel, H, & **Killgore, WD**. Predisposition towards unhealthy foods linked with increased gray matter in the cerebellum. Abstract presented at the Annual McLean Hospital Research Day, January 22, 2014.

261. Olson, EA, Weber, M, Tkachenko, O, & **Killgore, WD**. Daytime sleepiness is associated with decreased integration of remote outcomes on the IGT. Abstract presented at the Annual McLean Hospital Research Day, January 22, 2014.

262. Cui, J, Tkachenko, O, & **Killgore, WD**. Can the activation of anterior cingulate predict the emotional suppression? An fMRI study with masked faces. Abstract presented at the Annual McLean Hospital Research Day, January 22, 2014.

263. Gogel, H, & **Killgore WDS**. A psychometric validation of the Design Organization Test (DOT) in a healthy sample. Abstract presented at the 42nd Annual Meeting of the International Neuropsychological Society, Seattle WA, February 12-15, 2014.

264. **Killgore, WD**, Kipman, M, Tkachenko, O, Gogel, H., Preer, L, Demers, LA, Divatia, SC, Olson, EA, & Weber, M. Predicting resilience against sleep loss with multi-modal neuroimaging. Abstract presented at the 42nd Annual Meeting of the International Neuropsychological Society, Seattle WA, February 12-15, 2014.

265. **Killgore, WD**, Weber, M, Bark, JS, Kipman, M, Gogel, H, Preer, L, Tkachenko, O, Demers, LA, Divatia, SC, & Olson, EA. Physical exercise correlates with hippocampal volume in healthy adults. Abstract presented at the 42nd Annual Meeting of the International Neuropsychological Society, Seattle WA,

February 12-15, 2014.

266. **Killgore, WD**, Tkachenko, O, Weber, M, Kipman, M, Preer, L, Gogel, H, & Olson, EA. The association between sleep, functional connectivity, and emotional functioning. Abstract presented at the 42nd Annual Meeting of the International Neuropsychological Society, Seattle WA, February 12-15, 2014.

267. Preer, L, Tkachenko, O, Gogel, H, Bark, JS, Kipman, M, Olson, EA, & **Killgore, WD**. The role of personality in sleep initiation problems. Abstract presented at the 42nd Annual Meeting of the International Neuropsychological Society, Seattle WA, February 12-15, 2014.

268. Tkachenko, O, Weber, M, Olson, EA, Gogel, H, Preer, LA, Divatia, SC, Demers, LA, & **Killgore, WD**. Gray matter volume within the medial prefrontal cortex correlates with behavioral risk taking. Abstract presented at the 42nd Annual Meeting of the International Neuropsychological Society, Seattle WA, February 12-15, 2014.

269. Olson, EA, Weber, M, Bark JS, Demers L, Divatia, SC, Gogel, H, Kipman M, Preer, L, Tkachenko, O, & **Killgore, WD**. Sex differences in threat evaluation of emotionally neutral faces. Abstract presented at the 42nd Annual Meeting of the International Neuropsychological Society, Seattle WA, February 12-15, 2014.

270. Cui, J, Tkachenko, O, & **Killgore, WD**. Can the activation of anterior cingulate predict the emotional suppression? An fMRI study with masked faces. Abstract presented at the 36nd Annual Conference of the Anxiety Disorders Association of America, Chicago, IL, March 27-30, 2014.

271. Webb, CA, Weber, M, Mundy, EA, & **Killgore, WD**. Reduced gray matter volume in the anterior cingulate, orbitofrontal cortex and thalamus as a function of depressive symptoms: A voxel-based morphometric analysis. Abstract presented at the 36nd Annual Conference of the Anxiety Disorders Association of America, Chicago, IL, March 27-30, 2014.

272. Weber, M, Penetar, DM, Trksak, GH, Kipman, M, Tkachenko, O, Bark, JS, Jorgensen, AL, Rauch, SL, & **Killgore, WD**. Light therapy may improve sleep and facilitate recovery from mild traumatic brain injury. Abstract presented at the 10th World Congress on Brain Injury, San Francisco, CA, March 19-22, 2014.

273. Cui, J, Tkachenko, O, & **Killgore, WD**. Can the activation of anterior cingulate predict the emotional suppression? An fMRI study with masked faces. Abstract presented at the 21st Annual Meeting of the Cognitive Neuroscience Society, Boston, MA, April 5-8, 2014.

274. Divatia, S, Demers, LA, Preer, L, Olson, EA, Weber, M, & **Killgore, WD**. Advantageous decision making linked with increased gray matter volume in the ventromedial prefrontal cortex. Abstract presented at the 21st Annual Meeting of the Cognitive Neuroscience Society, Boston, MA, April 5-8, 2014.

275. Demers, LA, Olson, EA, Weber, M, Divatia, S, Preer, L, & **Killgore, WD**. Paranoid traits are related to deficits in complex social decision making and reduced superior temporal sulcus volume. Abstract presented at the 21st Annual Meeting of the Cognitive Neuroscience Society, Boston, MA, April 5-8, 2014.

276. Preer, LA, Weber, M, Tkachenko, O, Divatia, S, Demers, LA, Olson, EA, & **Killgore, WD**. Gray matter volume in the amygdala is associated with facial assessments of trustworthiness. Abstract presented at the 21st Annual Meeting of the Cognitive Neuroscience Society, Boston, MA, April 5-8, 2014.

277. Tkachenko, O, Weber, M, Gogel, H, & **Killgore, WD**. Predisposition towards unhealthy foods linked with increased gray matter volume in the cerebellum. Abstract presented at the 21st Annual Meeting of the

Cognitive Neuroscience Society, Boston, MA, April 5-8, 2014.

278. Olson, EA, Weber, M, Gogel, H, & **Killgore, WD**. Daytime sleepiness is associated with decreased integration of remote outcomes on the IGT. Abstract presented at the 21st Annual Meeting of the Cognitive Neuroscience Society, Boston, MA, April 5-8, 2014.

279. Demers, LA, Preer, LA, Gogel, H, Olson, EA, Weber, M, & **Killgore, WD**. Left-hemifield bias on sad chimeric face task correlates with interpersonal emotional intelligence. Abstract presented at the 69th Annual Meeting of the Society of Biological Psychiatry, New York, NY, May 8-10, 2014.

280. Weber, M, **Killgore, WD**, Olson, EA, Rosso, IM, & Rauch, SL. Morphological brain network organization in relation to trauma and posttraumatic stress disorder. Abstract presented at the 69th Annual Meeting of the Society of Biological Psychiatry, New York, NY, May 8-10, 2014.

281. Divatia, S, Demers, LA, Preer, L, Gogel, H, Kipman, M, & **Killgore, WD**. Schizotypal and manic traits are associated with poorer perception of emotions in healthy individuals. Abstract presented at the 69th Annual Meeting of the Society of Biological Psychiatry, New York, NY, May 8-10, 2014.

282. **Killgore, WD**, Weber, M, Olson, EA, & Rauch, SL. Sleep reduction and functioning of the emotion regulation circuitry. Abstract presented at the 69th Annual Meeting of the Society of Biological Psychiatry, New York, NY, May 8-10, 2014. ***[*Blue Ribbon Finalist for Top Poster Award: Basic Neuroscience]***

283. Webb, CA, Weber, M, Mundy, EA, & **Killgore, WD**. Reduced gray matter volume in the anterior cingulate, orbitofrontal cortex and thalamus as a function of depressive symptoms: A voxel-based morphometric analysis. Abstract presented at the 69th Annual Meeting of the Society of Biological Psychiatry, New York, NY, May 8-10, 2014.

284. Marin MF, Song H, Landau AJ, Lasko NB, Foy Preer LA, Campbell A, Pace-Schott EF, **Killgore WD**, Orr SP, Pitman RK, Simon NM, Milad MR (2014). Psychophysiological and Neuroimaging Correlates of Fear Extinction Deficits Across Anxiety Disorders. Abstract presented at the 69th Annual Meeting of the Society of Biological Psychiatry, New York, NY, May 8-10, 2014.

285. **Killgore, WD**. The effects of sleep loss on food preference. Abstract presented at SLEEP 2014, Minneapolis, MN, May 31-June 4, 2014.

286. Weber, M, & **Killgore, WD**. Sleep habits reflect in functional brain network organization. Abstract presented at SLEEP 2014, Minneapolis, MN, May 31-June 4, 2014. ***[*2014 AASM Young Investigator Award, Honorable Mention]***

287. Freed, MC, Novak, LA, **Killgore, WD**, Koehlmoos, TP, Ginsberg, JP, Krupnick, J, Rauch S, Rizzo, A, Engle, CC. DoD IRB delays: Do they really matter? And if so, why and for whom? Abstract presented at the Military Health System Research Symposium, Fort Lauderdale, FL, August 18-21, 2014.

288. Freed, MC, Novak, LA, **Killgore, WD**, Koehlmoos, TP, Ginsberg, JP, Krupnick, J, Rauch S, Rizzo, A, Engle, CC. DoD IRB delays: Do they really matter? And if so, why and for whom? Abstract presented at the AMSUS Annual Meeting, Washington DC, December 2-5, 2014.

289. **Killgore, WD**, Demers, LA, Olson, EA, Rosso, IM, Webb, CA, & Rauch, SL. Anterior cingulate gyrus and sulcus thickness: A potential predictor of remission following internet-based cognitive behavioral therapy for major depressive disorder. Abstract presented at the 53rd Annual Meeting of the American

College of Neuropsychopharmacology, Phoenix, AZ, December 7-11, 2014.

290. Olson, EA, Buchholz, J, Rosso, IM, **Killgore, WD**, Webb, CA, Gogel, H, & Rauch, SL. Internet-based cognitive behavioral therapy effects on symptom severity in major depressive disorder: preliminary results from a randomized controlled trial. Abstract presented at the 53rd Annual Meeting of the American College of Neuropsychopharmacology, Phoenix, AZ, December 7-11, 2014.

291. Brennan, B, Tkachenko, O, Schwab, Z, Ryan, E, Athey, A, Pope, H, Dougherty, D, Jenike, M, **Killgore, WD**, Hudson, J, Jensen, E, & Rauch SL. Abstract presented at the 53rd Annual Meeting of the American College of Neuropsychopharmacology, Phoenix, AZ, December 7-11, 2014.

292. Alkozei, A, Pisner, D, & **Killgore, WD**. Emotional intelligence is differentially correlated with prefrontal cortical responses to backward masked fearful and angry faces. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

293. Alkozei, A, Schwab, Z, & **Killgore, WD**. Looking for evil intent: Emotional intelligence and the use of socially relevant facial cues during an emotional decision making task. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

294. Shane, BR, Alkozei, A, & **Killgore, WD**. The contribution of general intelligence and emotional intelligence to the ability to appreciate humor. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

295. Markowski, SM, Alkozei, A, & **Killgore, WD**. Sleep onset latency and duration are associated with self-perceived invincibility. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

296. Pisner, D, Alkozei, A, & **Killgore, WD**. Visuospatial reasoning mediates the relationship between emotion recognition and emotional intelligence. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

297. Vanuk, JR, Fridman, A, Demers, LA, Divatia, S, & **Killgore, WD**. Engaging in meditation and internet based training as a means of enhancing emotional intelligence. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

298. Vanuk, JR, Divatia, S, Demers, LA, Markowski, SM, & **Killgore, WD**. Napping in conjunction with brief internet-based training as a means of enhancing emotional intelligence. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

299. Cui, J, Tkachenko, O, Gogel, H, Kipman, M, Preer, LA, Weber, M, Divatia, SC, Demers, LA, Olson, EA, Buchholz, JL, Bark, JS, Rosso, IM, Rauch, SL, & **Killgore, WD**. Fractional Anisotropy of frontoparietal connections predicts individual resistance to sleep deprivation. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

300. **Killgore, WD**, Olson, EA, Weber, M, Rauch, SL, & Nickerson, LD. Emotional intelligence is associated with coordinated resting state activity between emotion regulation and interoceptive experience networks. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

301. **Killgore, WD**, Demers, LA, Divatia, S, Kipman, M, Tkachenko, O, Weber, M, Preer, LA, Gogel, H,

Olson, EA, Vanuk, JR, & Rauch, SL. Enhancing emotional intelligence via brief internet-based training. Abstract presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO, February 4-7, 2015.

302. Buchholz, JL, Rosso, IM, Olson, EA, **Killgore, WD**, Fukunaga, R, Webb, CA, & Rauch, SL. Internet-based cognitive behavioral therapy is associated with symptom reduction and cognitive restructuring in adults with major depressive disorder. Abstract presented at the Anxiety and Depression Conference, Miami, FL, April 9-12, 2015.

303. Alkozei, A, Pisner, D, Rauch, SL, & **Killgore, WD**. Emotional intelligence and subliminal presentations of social threat. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

304. Shane, BR, Alkozei, A, Vanuk, JR, Weber, M, & **Killgore, WD**. The effect of bright light therapy for improving sleep among individuals with mild traumatic brain injury. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

305. Vanuk, JR, Shane, BR, Alkozei, A, & **Killgore, WD**. Trait emotional intelligence is associated with greater resting state functional connectivity within the default mode and task positive networks. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

306. Vanuk, JR, Fridman, A, Demers, LA, & **Killgore, WD**. Engaging in meditation and internet-based training as a means of enhancing emotional intelligence. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

307. Pisner, D, Alkozei, A, & **Killgore, WD**. Trait emotional suppression is associated with decreased activation of the insula and thalamus in response to masked angry faces. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

308. Markowski, SM, Alkozei, A, & **Killgore, WD**. The trait of neuroticism predicts neurocognitive performance in healthy individuals. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

309. Buchholz, JL, Rosso, IM, **Killgore, WD**, Fukunaga, R, Olson, EA, Demers, LA, & Rauch, SL. Amygdala volume is associated with helplessness in adults with major depressive disorder (MDD). Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

310. Sneider, JT, **Killgore, WD**, Rauch, SL, Jensen, JE, & Silveri, MM. Sex differences in the associations between prefrontal GABA and resistance to sleep deprivation. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

311. **Killgore, WD**, Rosso, IM, Rauch, SL, & Nickerson, LD. Emotional intelligence correlates with coordinated resting state activity between brain networks involved in emotion regulation and interoceptive experience. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

312. **Killgore, WD**, Demers, LA, Divatia, S, Rosso, IM, & Rauch, SL. Boosting Emotional intelligence with a brief internet-based program. Abstract presented at the 70th Annual Meeting of the Society of Biological

Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

313. **Killgore, WD**, Vanuk, JR, Alkozei, A, Markowski, SM, Pisner, D, Shane, BR, Fridman, A, & Knight, SA. Greater daytime sleepiness correlates with altered thalamocortical connectivity. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

314. **Killgore, WD**, Tkachenko, O, Gogel, H, Kipman, M, Sonis, LA, Divatia, SC, Demers, LA, Olson, EA, Buchholz, JL, Rosso, IM, & Rauch, SL. Activation of the ventral striatum predicts overeating during subsequent sleep loss. Abstract presented at the 70th Annual Meeting of the Society of Biological Psychiatry, Toronto, Ontario, CA, May 14-16, 2015.

315. Alkozei, A, Markowski, SM, Shane, BR, Rauch, SL, & **Killgore, WD**. Emotional resilience is not associated with increased emotional resistance to sleep deprivation. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

316. Alkozei, A, Pisner, D, Markowski, SM, Rauch, SL, & **Killgore, WD**. The effect of emotional resilience on changes in appetite for high-sugary food during sleep loss. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

317. Markowski, SM, Alkozei, A, Rauch, SL, & **Killgore, WD**. Self-perceived invincibility is associated with sleep onset latency and duration. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

318. Markowski, SM, Alkozei, A, Rauch, SL, & **Killgore, WD**. Sex differences in the association between personality and resistance to sleep deprivation. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

319. Shane, BR, Alkozei, A, & **Killgore, WD**. Physical exercise may contribute to vulnerability to sleep deprivation. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

320. Cui, J, Tkachenko, O, Gogel, H, Kipman, M, Sonis, LA, Weber, M, Divatia, SC, Demers, LA, Olson, EA, Buchholz, JL, Rosso, IM, Rauch, SL, & **Killgore, WD**. Resistance to sleep deprivation involves greater functional activation and white matter connectivity within a fronto-parietal network. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

321. Vanuk, JR, Rosso, IM, Rauch, SL, Alkozei, A, Markowski, SM, Pisner, D, Shane, BR, Fridman A, Knight, SA, & **Killgore, WD**. Daytime sleepiness is associated with altered thalamocortical connectivity. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

322. Sneider, JT, Jensen JE, Silveri, MM, & **Killgore, WD**. Prefrontal GABA predicts resistance to sleep deprivation. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

323. **Killgore, WD**, Tkachenko, O, Gogel, H, Kipman, M, Sonis, LA, Weber, M, Divatia, SC, Demers, LA, Olson, EA, Buchholz, JL, Rosso, IM, & Rauch, SL. Individual differences in rested activation of the ventral striatum predict overeating during sleep deprivation. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

324. **Killgore, WD**, Tkachenko, O, Rosso, IM, Rauch, SL, & Nickerson, LA. Multimodal neuroimaging to predict resistance to sleep deprivation. Abstract presented at the SLEEP 2015 Meeting, Seattle, WA, June 6-10, 2015.

325. Nickerson, LD & **Killgore, WD**. Resting state brain circuits underpinning a neurobiological model of Theory of Mind and Mentalizing. Abstract presented at the Organization for Human Brain Mapping Annual Meeting, 2015, Honolulu, HI, June 14-18, 2015.

326. Rosso, IM, Olson, EA, **Killgore WD**, Fukunaga, R, Webb, CA, & Rauch SL. A randomized trial of internet-based cognitive behavioral therapy for major depressive disorder. Abstract presented at the 54th Annual Meeting of the American College of Neuropsychopharmacology, Hollywood, FL, December 6-10, 2015.

327. Alkozei, A & **Killgore, WD**. Exposure to blue wavelength light is associated with increased dorsolateral prefrontal cortex responses during a working memory task. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

328. Klimova, A, Pisner, D & **Killgore, WD**. Neural correlates of cognitive and emotional impairments in acute versus chronic mild traumatic brain injury: a diffusion tensor imaging study. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

329. Markowski, S, Alkozei, A, & **Killgore, WD.** Greater neuroticism predicts higher performance in immediate memory, language, and attention in healthy individuals. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

330. Alkozei, A & **Killgore, WD.** Exposure to blue wavelength light suppresses anterior cingulate cortex activation in response to uncertainty during anticipation of negative or positive stimuli. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

331. Smith, R, Alkozei, A, Bao, J, & **Killgore, WD.** Successful goal-directed memory suppression is associated with increased inter-hemispheric coordination between right and left fronto-parietal control networks. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

332. Singh, P, Fridman, A, Pisner, D, Singh, A, & **Killgore, WD.** A voxel based morphometric analysis of ventromedial prefrontal cortex volume related with executive function task performance post mild traumatic injury. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

333. **Killgore, WD.** Baseline responsiveness of the ventral striatum predicts overeating during subsequent sleep deprivation. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

334. **Killgore, WD** & Nickerson, LD. Predicting resistance to sleep deprivation using multimodal neuroimaging. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

335. Sneider, J, Jensen, JE, Silveri, MM, & **Killgore, WD.** Prefrontal GABA correlates with the ability to sustain vigilance during sleep deprivation. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

336. Buchholz, JL, Olson, EA, Fukunaga, R, Webb, CA, **Killgore, WD**, Rauch, SL, & Rosso, IM. Expressive

suppression is associated with greater lateral orbitofrontal cortex volume in adults with major depressive disorder. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

337. Fridman, A, Pisner, D, Singh, P, & **Killgore, WD**. Gray matter volume in left medial prefrontal cortex is related to life satisfaction in individuals with mild traumatic brain injury. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

338. Singh, P, Pisner, D, Fridman, A, Roberts, S, & **Killgore, WD.** Volumetric differences in gray matter in healthy versus overweight/obese individuals post mild traumatic brain injury: A voxel based morphometric study. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

339. **Killgore, WD** & Weber, M. Blue wavelength light therapy reduces daytime sleepiness following mild traumatic brain injury. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

340. **Killgore, WD**, Weber, M, & Penetar, D. Blue wavelength light therapy improves balance following mild traumatic brain injury. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

341. Pisner, D, Smith, R, Alkozei, A, Klimova, A, & **Killgore, WD.** Highways of the emotional intellect: White matter microstructural correlates of an ability-based measure of emotional intelligence. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

342. Vanuk, JR, Smith, R, Knight, S, & **Killgore, WD.** Resting RSA correlates with coordinated resting state activity between brain networks involved in emotion perception. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

343. Vanuk, JR, Alkozei, A, Markowski, S, & **Killgore WD.** Greater resting state functional connectivity within the default mode and task positive networks is associated with trait emotional intelligence. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

344. Fukunaga, R, Webb, CA, Olson, EA, **Killgore, WD**, Rauch, SL, & Rosso, IM. Reduced rostral anterior cingulate volume is associated with greater frequency of negative automatic thoughts in adults with major depressive disorder. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

345. Olson, EA, Fukunaga, R., Webb, CA, Rosso, IM, **Killgore, WD**, & Rauch, SL. Delay discounting and anhedonia are independently associated with suicidal ideation in depression. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

346. Pisner, D, Singh, P, Fridman, A, & **Killgore, WD**. Resilience following mild traumatic brain injury is associated with gray matter volume in the left precentral gyrus. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

347. Sing, P, Fridman, A, Pisner, D, & **Killgore, WD.** Time dependent differences in gray matter volume in individuals post mild traumatic brain injury: A voxel based morphometric study. Abstract presented at the

44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

348. Smith, C, Smith, R, Sanova, A, & **Killgore, WD.** The neural basis of emotional working memory and its relation to adaptive emotional functioning. Abstract presented at the 44th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 3-6, 2016.

349. Quan, M, Gruber, SA, Lukas, SE, Hill, KP, **Killgore, WD**, & Nickerson, LD. Altered functional connectivity within large-scale brain networks during a cognitive task in chronic marijuana smokers. Abstract presented at the Harvard Psychiatry Research Day, Boston, MA, March 23, 2016. ***[*Semi Finalist Poster: Harvard Medical School Mysell Award]***

350. Fukunaga, R, Webb, CA, Olson, EA, **Killgore, WD**, Rauch, SL, & Rosso, IM. Improvement in negative automatic thoughts as a mediator of symptom improvement in internet-based cognitive behavioral therapy for major depressive disorder. Abstract presented at the 2016 Meeting of the Anxiety and Depression Association of America, Philadelphia, PA, March 31-April 3, 2016.

351. Bernstein, AS, Pisner, D, Klimova, A, Umapathy, L, Do, L, Squire, S, **Killgore, WD**, & Trouard, T. Effects of multiband acceleration on high angular resolution diffusion imaging data collection, processing, and analysis. Abstract presented at the 24th Annual Meeting of the International Society for Magnetic Resonance in Medicine (IMSRM), Singapore, May 7-8, 2016.

352. Alkozei, A, Markowski, SM, Pisner, D, Fridman, A, Shane, BR, Vanuk, JR, Knight, SA, & **Killgore, WD.** Exposure to blue wavelength light reduces activation within the anterior cingulate cortex during anticipation of certain reward stimuli. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

353. Alkozei, A., Pisner, D, Markowski, SM, Vanuk, JR, Fridman, A, Shane, BR, Knight SA, & **Killgore, WD.** Increases in prefrontal activation after exposure to blue versus amber wavelength light during cognitive load. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

354. Pisner, DA, Smith, R, Alkozei, A, Klimova, A, Millan, M, & **Killgore, WD.** Highways of the emotional intellect: White matter mictrostructural correlates of an ability-based measure of emotional intelligence. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

355. Singh, P, Pisner, D, Fridman, A, Singh A, Millan, M, & **Killgore, WD.** A voxel based morphometric analysis of ventromedial prefrontal cortex volume related with executive function task performance post mild traumatic brain injury. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

356. Smith, R, Smith, C, Khodr, O, Nettles, M, Sanova, A, & **Killgore, WD.** Emotional working memory: A relatively unexplored aspect of emotional and cognitive ability. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

357. Smith, R, Nettles, M, Khodr, O, Sanova, A, Smith, C, Alkozei, A, & **Killgore, WD.** Conflict-related dorsomedial frontal activation during healthy food decisions is associated with increased cravings for high-fat foods. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

358. Smith, R, Sanova, A, Nettles, M, Khodr, O, Smith, C, Alkozei, A, Lane, RD, & **Killgore, WD**. Unwanted reminders: The effects of emotional memory suppression on later neuro-cognitive processing. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

359. **Killgore, WD**, Weber, M, Palmer, W, & Penetar, D. Blue wavelength light therapy improves balance following mild traumatic brain injury. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

360. **Killgore, WD**, Tkachenko, O, Palmer, W, & Rauch, SL. Default mode activation predicts vulnerability to sleep deprivation in domains of mood, sleepiness, and vigilance. Abstract presented at the 71st Annual Scientific Convention of the Society for Biological Psychiatry, Atlanta, GA, May 12-14, 2016.

361. Alkozei, A, Markowski, SM, Pisner, D, Fridman, A, Shane, BR, Vanuk, JR, Knight, SA, Grandner, MA, & **Killgore, WD.** Exposure to blue wavelength light reduces activation within the anterior cingulate cortex during anticipation of certain reward stimuli. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

362. Alkozei, A, Pisner, D, Markowski, SM, Vanuk, JR, Fridman, A, Shane, BR, Knight, SA, Grandner, MA, & **Killgore, WD.** Exposure to blue wavelength light is associated with increased dorsolateral prefrontal cortex responses and increases in response times during a working memory task. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

363. Davis, B, Yang, R, **Killgore, WD**, Gallagher, RA, Carrazco, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Nightmares in a community sample: Prevalence and associations with daytime function independent of poor sleep quality and depression. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

364. Fisseha, E, Havens, C, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Sleep duration's important role in the relationship among difficulty concentrating, fatigue, stress, and depressed mood: Data from the SHADES study. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

365. Graham, PM, Goldstein, M, David, BM, Perlis, ML, Perfect, MM, Frye, S, **Killgore, WD**, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Longitudinal analysis of sleep duration using actigraphy and sleep diary: Stability and agreement over 8-11 months. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

366. Granados, K, Rojo-Wissar, DM, Chakravorty, S, Prather, A, Perfect, MM, Frye, S, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Adverse childhood exposures associated with adult insomnia symptoms. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

367. Grandner, MA, **Killgore, WD**, Khader, W, & Perlis, ML. Positive and negative mood ratings across 24-hours. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

368. Hall, C, Forbush, S, Youngstedt, S, **Killgore, WD**, Barilla, H, Gehrels, J, Alfonso-Miller, P, Palmer, W, Carrazco, N, & Grandner, MA. Habitual sleep duration and health: A possible role for exercise. Abstract

presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

369. Jackson, N, Patterson, F, Seixas, A, Jean-Louis, G, **Killgore, WD**, & Grandner, MA. Using big data to determine the social, behavioral, and environmental, determinants of sleep duration in the U.S. population: Application of a machine learning approach to data from approximately 700,000 Americans. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

370. **Killgore, WD**, Tkachenko, O, Grandner, MA, & Rauch, SL. Default mode activation predicts vulnerability to sleep deprivation in the domains of mood, sleepiness, and vigilance. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

371. **Killgore, WD**, Weber, M, Grandner, MA, & Penetar, DM. Blue wavelength light therapy improves balance following mild traumatic brain injury. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

372. Knight, SA & Killgore, WD. Typical sleep duration is associated with constructive thinking patterns. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

373. Kotzin, MD, Alkozei, A, Knight, SA, Grandner, MA, & **Killgore, WD**. The effects of trait gratitude on quality of sleep, intrusiveness, of pre-sleep cognitions, and daytime energy in healthy individuals. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

374. Markowski, SM, Alkozei, A, McIntosh, MB, Grandner, MA, & **Killgore, WD**. Chronotype and risk-taking propensity. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

375. McIntosh, MB, Markowski, SM, Grandner, MA, & **Killgore, WD**. Prior-night sleep duration is negatively associated with impulsivity in women. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

376. Ocano, D, Jean-Louis, G, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Sleep duration and decreased social support from family, friends, and significant other: Influence of insomnia and perceived stress level. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

377. Okuagu, A, Perlis, ML, Ellis, JA, Prather, AA, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Does thinking keep people awake? Or does it matter what they are thinking about? Self-directed cognitions associated with insomnia and insufficient sleep. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

378. Olivier, K, Gallagher, RA, **Killgore, WD**, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Development and initial validation of the Assessment of Sleep Environment: A novel inventory for describing and quantifying the impact of environmental factors on sleep. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15,

2016.

379. Paine, KN, Forbush, S, Ellis, J, Nowakowski, S, Newman-Smith, K, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Sleep duration and satisfaction with life, health, finances and relationship. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

380. Rhee, JU, Haynes, P, Chakravorty, S, Patterson, F, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Susceptibility to smoking during the day and its relationship with insomnia and sleep duration. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

381. Roberts, SE, Singh, P, Grandner, MA, & **Killgore, WD.** Later wake up time and impulsivity. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

382. Saccone, J, Davis, B, Chakravorty, S, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Habitual caffeine use and motivation to consume caffeine: Associations with sleep duration, sleepiness, fatigue, and insomnia severity. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

383. Singh, A, Fridman, A, Silveri, MM, Grandner, MA, & **Killgore, WD.** Medial prefrontal GABA predicts hunger ratings during sleep deprivation for men but not women. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

384. Vanuk, JR, Alkozei, A, Smith, R, Pisner, D, Markowski, SM, Shane, BR, Fridman, A, Knight, SA, Grandner, MA, & **Killgore, WD.** Changes in heart rate variability due to light exposure predict frontoparietal connectivity. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

385. Vanuk, JR, Alkozei, A, Knight, SA, Fridman, A, Markowski, SM, Pisner, D, Shane, BR, Grandner, MA, & **Killgore, WD.** The effects of light exposure on heart rate variability predict sleepiness and vigilance. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

386. Warlick, C, Chakravorty, S, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Timing of alcohol intake associated with insomnia symptoms. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

387. Waugaman, DL, Markowski, SM, Alkozei, A, Grandner, MA, & **Killgore, WD.** Chronotype and Emotional Intelligence. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

388. Weber, M, Grandner, MA, & **Killgore, WD.** Smaller gray matter volume of the visual cortex predicts vulnerability to sleep deprivation. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

389. Weber, M, Grandner, MA, & **Killgore, WD.** Blue wavelength light therapy reduces daytime sleepiness following mild traumatic brain injury. Abstract presented at the 30th Annual Meeting of the Associated

Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

390. Yang, R, Ocano, D, Chakravorty, S, **Killgore, WD**, Gallagher, RA, Carrazco, N, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Relationship between insomnia and depression moderated by caffeine. Abstract presented at the 30th Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2016), Denver, CO, June 11-15, 2016.

391. **Killgore, WD**, Vanuk, JR, Pisner, D, Penetar, DM, & Weber, M. Short wavelength light therapy facilitates recovery from mild traumatic brain injury. Abstract presented at the 2016 Military Health System Research Symposium (MHSRS), Orlando, FL, August 15-18, 2016.

392. **Killgore, WD**, Alkozei, A, Smith, R, Divatia, S, & Demers, L. Enhancing emotional intelligence skills with a brief internet-based program: A pilot study. Abstract presented at the 2016 Military Health System Research Symposium (MHSRS), Orlando, FL, August 15-18, 2016.

393. **Killgore, WD**, Rosso, IM, Olson, EA, Webb, CA, Fukunaga, R, Gogel, H, Buchholz, JL, & Rauch, SL. Efficacy of an internet-based cognitive behavior therapy program for major depression. Abstract presented at the 2016 Military Health System Research Symposium (MHSRS), Orlando, FL, August 15-18, 2016.

394. **Killgore, WD**, & Nickerson, LA. Linked analysis of multimodal neuroimaging identifies neural systems associated with the ability to resist sleep deprivation. Abstract presented at the 2016 Military Health System Research Symposium (MHSRS), Orlando, FL, August 15-18, 2016.

395. Vanuk, JR, Allen, JJB, & **Killgore, WD**. Heart rate variability during light exposure and subsequent network connectivity patterns. Abstract presented at the Annual Meeting of the Society for Psychophysiological Research, Minneapolis, MN, September 21-25, 2016.

396. Haberman, JT, Olson, EA, Webb, CA, **Killgore, WD**, Rauch, SL, & Rosso, IM. The relation between treatment expectancies and outcome in internet-based cognitive behavioral therapy for major depressive disorder. Abstract presented at the Association for Behavioral and Cognitive Therapies, New York, NY, October 27-30, 2016.

397. Rosso, IM, Olson, EA, Thomas, MO, Webb, CA, **Killgore, WD**, & Rauch, SL. Anterior cingulate cortex morphology predicts remission from major depression following internet-based cognitive behavior therapy. Abstract presented at the 55th Annual Meeting of the American College of Neuropsychopharmacology, Hollywood, FL, December 4-8, 2016.

398. Shane, BR, Vanuk, JR, Bajaj, S, Millan, M, **Killgore, WD**. Multimodal brain imaging in patients receiving bright light therapy following a mild traumatic brain injury. Abstract presented at the Western Medical Research Conference, Carmel CA, January 26-28, 2017.

399. Franco, J, Millan, M, Shane, BR, Castellanos, A, **Killgore, WD**. Blue wavelength light therapy increases thalamic grey matter volume following mild traumatic brain injury. Abstract presented at the 45th Annual Meeting of the International Neuropsychological Society, New Orleans, LA, February 1-4, 2017.

400. Alkozei, A, Smith, R, Demers, LA, Divatia, S, Weber, M, Berryhill, SM, & **Killgore, WD**. Emotional intelligence can be trained via an online training program and is associated with better performance on the IGT. Abstract accepted for oral platform presentation at the 45th Annual Meeting of the International Neuropsychological Society, New Orleans, LA, February 1-4, 2017.

401. Li, H, Gruber, S, Lukas, S, Silveri, M, Hill, K, **Killgore, WD**, & Nickerson, LD. Data fusion to investigate the effect of chronic heavy marijuana use on brain structure. Abstract presented at the 2017 Harvard Psychiatry Research Day Poster Session, Boston, MA, April 12, 2017.

402. Challener, S, Alkozei, A, Fridman, A, Dormer A, & **Killgore, WD.** Higher depressive symptoms are associated with lower activation in the orbitofrontal cortex when anticipating negative stimuli in individuals with PTSD. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

403. Alkozei, A, Smith R, Fridman A, Dormer, A, Challener, S, & **Killgore, WD.** Neural responses to emotional stimuli in individuals with PTSD after daily morning blue light exposure. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

404. Alkozei, A, Smith R, Fridman, A, Dormer, A, Challener, S, & **Killgore, WD.** The role of trait gratitude on functional brain activation changes when anticipating negative events in individuals with PTSD. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

405. Fridman, AJ, Alkozei, A, Smith, R, Challener, S, Knight, SA, & **Killgore, WD**. Resiliency is associated with reduced activation within the retrosplenial cortex and secondary motor area for individuals with PTSD during anticipation of a negative event. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

406. Vanuk, JR, Millan, M, Shane, BR, Bajaj, S, & **Killgore, WD**. Blue light therapy following a mild traumatic brain injury improves MPFC-amygdala functional connectivity and mood. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

407. **Killgore, WD**, Shane, BR, Vanuk, JR, Franco, J, Castellanos, A, Millan, M, Grandner, MA, & Bajaj, S. Light therapy facilitates thalamo-cortical brain recovery from mild traumatic brain injury. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

408. Smith, R, Lane, RD, Alkozei, A, Bao J, Smith, C, Sanova, A, Nettles, M, & **Killgore, WD**. Common and unique neural systems underlying the maintenance of emotional vs. bodily reactions to affective stimuli: the moderating role of emotional awareness. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

409. Bajaj, S, Alkozei, A & **Killgore, WD**. Effect of bright light therapy on white matter abnormalities following a mild traumatic brain injury. Abstract presented at the 72nd Annual Convention of the Society for Biological Psychiatry, San Diego, CA, May 18-20, 2017.

410. Alkozei, A, Smith, R, Fridman, A, Dormer A, Challener, S, Grandner, MA, & **Killgore, WD**. Daily morning blue light exposure leads to changes in functional brain responses during emotional anticipation in individuals with PTSD. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

411. Gottschlich, MK, Hyman, S, Millan M, Pisner, D, Singh, A, Knight, SA, Grandner, MA, & **Killgore, WD**. Post-concussion severity is associated with sleep problems and neuropsychological status. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

412. Vanuk, JR, Shane, BR, Millan, M., Bajaj, S, Grandner, MA, & **Killgore, WD**. Short-wavelength light

therapy as a way of improving sleep, cognition, and functional connectivity following mild traumatic brain injury. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

413. **Killgore, WD**, Shane, BR, Vanuk, JR, Franco, J, Castellanos, A, Millan, M, Grandner, MA, & Bajaj, S. Short wavelength light therapy facilitates recovery from mild traumatic brain injury. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

414. **Killgore, WD**, Capaldi, VF, Balkin, TJ, & Kamimori, GH. The trait of introversion-extraversion contributes to sustained performance on planning and sequencing abilities during sleep deprivation. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

415. Bajaj, S, Alkozei, A, Grandner, MA, & **Killgore, WD**. Effect of bright light therapy on brain and behavioral abnormalities following a mild traumatic brain injury. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

416. Oliver, K, Gallagher, R, Hale, L, Barrett, M, Branas, C, **Killgore, WD**, Parthasarathy, S, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Development and initial validation of a brief measure of control over sleep. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

417. Grandner, MA, Athey, A, **Killgore WD**, Alfonso-Miller, P. Preliminary results of a sleep health intervention in student athletes: Changes in sleep, energy level, and mental well-being, and body weight. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

418. Yang, R, Gallagher, R, Hale, L, Perlis, M, Barrett, M, Branas, C, **Killgore, WD**, Parthasarathy, S, Alfonso-Miller, P, Gehrels, J, Grandner, MA. Would you call yourself a short or long sleeper? Perceptions of sleep category associated with reported sleep duration, insomnia, and health. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

419. Fisseha, E, Gallagher, R, Hale, L, Branas, C, Barrett, M, **Killgore, WD**, Alfonso-Miller, P, Jean-Louis, G, Seixas, A, Williams, N, Gehrels, J, & Grandner, MA. Habitual weekday sleep duration associated with multiple dimensions of socioeconomic status. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

420. Poling, K, Gallagher, R, Hale, L, Branas, C, Seixas, A, Jean-Louis, G, **Killgore, WD**, Alfonso-Miller, P, Parthasarathy, S, Gehrels, J, & Grandner, MA. Sleep partially mediates the association between food insecurity and obesity: Roles of short sleep duration, insomnia, and socioeconomic factors. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

421. Forbush, S, Fisseha, E, Gallagher, R, Hale, L, Malone, S, Patterson, F, Branas, C, Barrett, M, **Killgore, WD**, Gehrels, J, Alfonso-Miller, P, & Grandner, MA. Sociodemographics, poor overall health, cardiovascular disease, depression, fatigue, and daytime sleepiness associated with social jetlag independent of sleep duration and insomnia. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

422. Till, K, Athey, A, Chakravorty, S, **Killgore, WD**, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Insomnia and daytime tiredness in student athletes associated with risky behaviors and poor decision making when under the influence of alcohol. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

423. Warlick, C, Hall, C, Athey, A, Chakravorty, S, **Killgore, WD**, Alfonso-Miller, P, Gehrels, J, & Grandner,

MA. Difficulty sleeping associated with substance use among student athletes. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

424. Jaszewski, A, Athey, A, **Killgore, WD**, Alfonso-Miller, P, Gehrels, J, & Grandner, MA. Sleep duration and quality associated with mental well-being in student athletes. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

425. Athey, A, Alfonso-Miller, P, **Killgore, WD**, & Grandner, MA. Preliminary results of a sleep health intervention in student athletes: Perceived changes to sleep, performance, and mental and physical wellbeing. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

426. Goel, N, Taylor, DM, Abel, T, **Killgore, WD**, Pearson-Leary, J, & Bhatnagar, S. MicroRNAs are cross-species markers of sleep loss in humans and rats. Abstract presented at the Organization for Human Brain Mapping Conference, Boston, MA, June 3-7, 2017.

427. Meridew, C, Jaszewski, A, Athey, A, Alfonso-Miller, P, **Killgore, WD**, Gehrels, J, & Grandner, MA. Impact of time and activity demands on sleep of student athletes: It's not about reduced sleep opportunity. Abstract presented at the SLEEP Meeting, Boston, MA, June 3-7, 2017.

428. Bajaj, S, Rosso, IM, Rauch, SL, & **Killgore WD**. Impact of bright light therapy on volume and cortical thickness of the brain following mild traumatic brain injury. Abstract presented at the Organization for Human Brain Mapping Conference, Vancouver, Canada, June 25-29, 2017.***[selected for travel award]**

429. Bajaj, S, Rosso, IM, Rauch, SL, & **Killgore, WD**. Effect of bright light therapy on white matter abnormalities following mild traumatic brain injury. Abstract presented at the Organization for Human Brain Mapping Conference, Vancouver, Canada, June 25-29, June 3-7, 2017.

430. Alkozei, A, Haack, M, Smith, R, Dailey, N, Bajaj, S, & **Killgore, WD**. Chronic sleep restriction increases negative implicit attitudes toward Arab Muslims. Abstract presented at the Military Health Systems Research Symposium, Kissimmee, FL, August 27-30, 2017.

431. **Killgore WD**, Vanuk, JR, Bajaj, S. Blue wavelength light therapy increases axonal myelination in mild traumatic brain injury. Abstract presented at the Military Health Systems Research Symposium, Kissimmee, FL, August 27-30, 2017.

432. **Killgore WD**. What makes a Super-Soldier: Identifying the neural correlates of individual differences in resilience against sleep deprivation. Abstract presented at the Military Health Systems Research Symposium (MHSRS), Kissimmee, FL, August 27-30, 2017.

433. Dailey, NS, Bajaj, S, Alkozei, A, & **Killgore WD**. Neural correlates of aggression during chronic and subacute stages of recovery from mild traumatic brain injury. Abstract presented at the Military Health Systems Research Symposium, Kissimmee, FL, August 27-30, 2017.

434. Bajaj, S, Alkozei, A, & **Killgore WD**. Short wavelength light therapy following mild traumatic brain injury: Can we normalize the abnormal diffusion and quantity of water within the brain? Abstract presented at the Military Health Systems Research Symposium, Kissimmee, FL, August 27-30, 2017.

435. Goel, N, Taylor, DM, Abel, T, **Killgore, WD**, Pearson-Leary, J, & Bhatnagar, S. MicroRNAs are cross-species markers of sleep loss in humans and rats. Abstract presented at the Society for Neuroscience, Washington, DC, November 11-15, 2017.

436. Dailey, NS, Bajaj, S, Alkozei, A, Smith, R, Knight, SA, & **Killgore, WD**. Neural correlates of aggression in the chronic and post-acute stages of recovery from mild traumatic brain injury: A diffusion tensor imaging study. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

437. Challener, S, Alkozei, A, Fridman, A, Dormer, A, & **Killgore, WD**. Higher depressive symptoms are associated with lower activation in the orbital frontal cortex when anticipating negative stimuli in individuals with PTSD. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

438. Alkozei, A, Smith, R, Demers, L, Divatia, S, Weber, M, Berryhill, S, & **Killgore, WD**. Emotional intelligence can be trained via an online training program and is associated with better performance on the IGT. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

439. Satterfield, B, Raikes, AC, & **Killgore, WD**. A voxel-based morphometric analysis of resilience to vigilant attention impairment during sleep deprivation. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

440. Singh, A, Thurston, MD, Gottschlich, MK, Miller, MA, & **Killgore, WD**. Trait anxiety predicts hostile tendencies post-traumatic brain injury. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

441. Raikes, AC, Satterfield, BC, Knight, SA, & **Killgore, WD**. Grey matter volumetric differences with increasing numbers of previous mild traumatic brain injuries: A voxel-based morphometric study. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

442. Bajaj, S, Dailey, N, Alkozei, A, Vanuk, JR, & **Killgore, WD**. Preservation of limbic network structure in healthy young adults. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

443. Alkozei, A, **Killgore, WD**, Smith, R, Dailey, NS, Bajaj, S, & Haack, M. Chronic sleep restriction increases negative implicit attitudes toward Arab Muslims. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

444. Skalamera, J, Alkozei, A, Haack, M, & **Killgore, WD**. Chronic sleep restriction increases racial bias and affects actual decision-making about people. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

445. Alkozei, A, Smith, R, & **Killgore, WD**. Increases in prefrontal activation after exposure to blue versus amber wavelength light during cognitive load. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

446. Knight, SA, & **Killgore, WD**. Typical sleep duration is associated with constructive thinking patterns. Abstract presented at the University of Arizona Junior Investigator Poster Forum, Tucson, AZ, November 17, 2017.

447. Nickerson, L, Li, H, Smith, S, Lukas, S, Silveri, M, Hill, K, **Killgore, WD**, & Gruber, S. Combining multi-site/study MRI data: A novel linked-ICA denoising method for removing scanner and site variability from

muli-modal MRI data. Abstract presented at the American College of Neuropsychopharmacology (ACNP) 56th Annual Meeting, Palm Springs, CA, December 3-7, 2017.

448. Bajaj, S, Raikes, AC, Dailey, NS, Vanuk, JR, Weber, M, Rosso, IM, Rauch, SL, & **Killgore, WD**. Changes in cortical structure, sleep, and anxiety symptoms following blue-wavelength light therapy in individuals with mild traumatic brain injury. Abstract presented at the Big Sky Athletic Training Sports Medicine Conference, Big Sky, MT, February 4-8, 2018.

449. Dailey, NS, Raikes, AC, Smith, R, Alkozei, A, & **Killgore, WD**. The executive control network after mild traumatic brain injury: Associations between functional connectivity and aggression. Abstract presented at the Big Sky Athletic Training Sports Medicine Conference, Big Sky, MT, February 4-8, 2018.

450. Raikes, AC, Satterfield, BC, Dailey, NS, Bajaj, S, & **Killgore, WD**. Self-reported sleep quality is related to cerebellar grey matter volume after mild traumatic brain injury. Abstract presented at the Big Sky Athletic Training Sports Medicine Conference, Big Sky, MT, February 4-8, 2018.

451. Raikes, AC, Bajaj, S, Dailey, NS, Satterfield, BC, Alkozei, A, Smith, R, & **Killgore, WD**. White matter correlates of self-reported sleep quality after a mild traumatic brain injury: A DTI study. Abstract presented at the Big Sky Athletic Training Sports Medicine Conference, Big Sky, MT, February 4-8, 2018.

452. Satterfield, BC, Raikes, AC, & **Killgore, WD**. A voxel-based morphometric analysis of resilience to vigilant attention impairment during sleep deprivation. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

453. Alkozei, A, Smith, R, Dailey, NS, Bajaj, S, Knight SA, & **Killgore, WD**. Exposure to blue wavelength light during memory consolidation improves long-delay verbal memory performance. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

454. Alkozei, A, Smith, R, Dailey, NS, Bajaj, S, Haack, M, & **Killgore, WD**. Men, but not Women, show a decrease in implicit preferences for low-calorie food after 3 weeks of chronic sleep restriction. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

455. Alkozei, A, Smith, R, & **Killgore, WD**. A positive cognitive style mediates the relationship between trait gratitude and depressive symptoms. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

456. Bajaj, S, Dailey, NS, Alkozei, A, Vanuk, JR, & **Killgore, WD**. Preservation of limbic network structure in healthy young adults. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

457. Alkozei, A, Smith, R, Demers, LA, Divatia, S, Weber, M, Berryhill, SM, & **Killgore, WD**. Emotional intelligence can be trained via an online training program and is associated with better performance on the IGT. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

458. Dailey, NS, Bajaj, S, Alkozei, A, Smith, R, Knight, SA, & **Killgore, WD**. Neural correlates of aggression in the chronic and post-acute stages of recovery from mild traumatic brain injury: A diffusion tensor imaging study. Abstract presented at the 46th Annual Meeting of the International Neuropsychological

Society, Washington, DC, February 14-17, 2018.

459. **Killgore, WD**, Shane, BR, Vanuk, JR, Millan, M, Knight, SA, & Bajaj, S. Blue light therapy accelerates brain and cognitive recovery from mild traumatic brain injury. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

460. **Killgore, WD**. Default mode activation and the ability to resist sleep deprivation. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

461. **Killgore, WD**, Capaldi, VF, Balkin, TJ, & Kamimori, GH. Personality traits predict the ability to sustain executive function abilities during sleep deprivation. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

462. Raikes, AC, & **Killgore, WD**. Increased cerebellar grey matter in the presence of decreased subjective sleep quality following mild traumatic brain injury. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

463. Raikes, AC, Satterfield, BC, Knight, SA, & **Killgore, WD**. Gray matter volumetric differences with increasing numbers of previous mild traumatic brain injuries: A voxel-based morphometric study. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

464. Skalamera, J, Alkozei, A, Haack, M, & **Killgore, WD**. Chronic sleep restriction increases implicit racial biases and affects actual decision-making about people. Abstract presented at the 46th Annual Meeting of the International Neuropsychological Society, Washington, DC, February 14-17, 2018.

465. Huanjie, L, Silveri, M, Lukas, SE, Hill, K, **Killgore, WD**, Gruber, S, & Nickerson, LD. Data fusion to investigate multimodal MRI patterns associated with chronic heavy marijuana use. Abstract presented at the Harvard Psychiatry Day Poster Session, Boston, MA, April 4, 2018.

466. Bajaj, S, Dailey, NS, Vanuk, JR, Raikes, A, Weber, M, Rosso, IM, Rauch, SL, & **Killgore, WD**. Impact of blue light therapy on cortical volume, sleep and anxiety symptoms following mild traumatic brain injury. Abstract presented at the Anxiety and Depression Association of America (ADAA) Conference, Washington, DC, April 5-8, 2018.

467. Knight, SA, & **Killgore, WD**. Constructive thinking patterns correlate with typical sleep habits. Abstract presented at the Anxiety and Depression Association of America (ADAA) Conference, Washington, DC, April 5-8, 2018.

468. Raikes, AC, Dailey, NS, Bajaj, S, & **Killgore, WD**. White matter structure changes associated with depressive symptoms following recent mild traumatic brain injury. Abstract presented at the Anxiety and Depression Association of America (ADAA) Conference, Washington, DC, April 5-8, 2018.

469. Singh, A, Thurston, MD, Gottschlich, MK, Miller, MA, & **Killgore, WD**. Trait anxiety predicts hostile tendencies post-traumatic brain injury. Abstract presented at the Anxiety and Depression Association of America (ADAA) Conference, Washington, DC, April 5-8, 2018.

470. Bajaj, S, Raikes, AC, Alkozei, A, Dailey, NS, Satterfield, BC, Vanuk, JR, & **Killgore, WD**. Association between suicidal ideation and cortical volume in a sub-clinical sample of young individuals. Abstract

presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

471. Challener, S, Alkozei, A, Young, A, Ozcan, M, Raikes, AC, & **Killgore, WD**. Sleep problems are associated with greater default mode network activation when anticipating negative stimuli in individuals with PTSD. Abstract presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

472. Dailey, NS, Smith, R, Raikes, AC, Alkozei, A, & **Killgore, WD**. Reduced functional connectivity in the executive control network following mild traumatic brain injury: Implications for emotional regulation. Abstract presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

473. **Killgore, WD**, Kent, HC, Knight, SA, & Alkozei, A. Changes in morning salivary melatonin correlate with prefrontal responses during working memory performance. Abstract presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

474. **Killgore, WD**, Alkozei, A, & Weber, M. Blue light therapy improves executive function following mild traumatic brain injury. Abstract presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

475. Ozcan, M, Challener, S, Yung, A, Alkozei, A, Raikes, AC, & **Killgore, WD**. Daytime sleepiness in individuals with PTSD is associated with greater activation in the right angular gyrus when viewing negative images. Abstract presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

476. Smith, R, Sanova, A, Lane, RD, & **Killgore, WD**. Graph-theoretic correlates of trait differences in emotional awareness. Abstract presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

477. Yung, A, Challener, S, Ozcan, M, Alkozei, A, Raikes, AC, & **Killgore, WD**. Improvements in PTSD symptom severity are associated with greater activation in the hippocampus during anticipation of negative stimuli. Abstract presented at the Society of Biological Psychiatry 73rd Annual Meeting, New York, NY, May 10-12, 2018.

478. Satterfield, BC, Silveri, M, Alkozei, A, Raikes, AC, & **Killgore, WD**. GABA: A neural marker of resilience to psychomotor vigilance impairment during sleep deprivation. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018. [*Trainee Merit Award]

479. Satterfield, BC, Alkozei, A, Raikes, AC, & **Killgore, WD**. Habitual sleep duration predicts caloric and mactronutrient intake during sleep deprivation. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

480. Bajaj, S, Raikes, A, Dailey, NS, Vanuk, JR, Satterfield, BC, Alkozei, A, Weber, M, Rosso, IM, Rauch, SL, Grandner, MA, & **Killgore, WD**. Impact of blue light therapy on cortical structure, sleep, and anxiety symptoms following mild traumatic brain injury. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

481. Challener, S, Alkozei, A, Yung, A, Ozcan, M, Raikes, AC, & **Killgore, WD**. Functional impairment due to excessive daytime sleepiness is associated with greater activation in the default mode network when anticipating negative stimuli in individuals with PDSD. Abstract presented at the SLEEP 2018 Annual

Meeting, Baltimore, MD, June 2-6, 2018.

482. **Killgore, WD**, Alkozei, A, Knight, SA, Miller, MA, Grandner, MA, & Weber, M. Daily morning blue light exposure enhances executive functioning in individuals with mild traumatic brain injury. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

483. **Killgore, WD**, & Nickerson, LA. Resistance to sleep deprivation is predicted by gray matter volume in the posterior brain stem. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

484. Alkozei, A, Kent, HC, Knight, SA, & **Killgore, WD**. Changes in morning salivary melatonin correlate with prefrontal responses during working memory performance. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

485. Ozcan, M, Alkozei, A, Raikes, A, & **Killgore, WD**. Pre-sleep cognitions partially mediate the relationship between depression and daytime energy. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

486. Raikes, AC, Dailey, NS, Satterfield, BC, Bajaj, S, & **Killgore, WD**. Self-reported sleep quality is associated with reductions in white-matter integrity following recent mild traumatic brain injury. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

487. Raikes, AC, Satterfield, BC, Dailey, NS, Bajaj, S, & **Killgore, WD**. Subjectively poor sleep quality is associated with increased cerebellar grey matter volume following mild traumatic brain injury. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

488. Skalamera, J, Alkozei, A, Haack, M, & **Killgore, WD**. The effect of chronic sleep restriction on implicit racial biases and explicit judgmental decision-making. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

489. Sanchez, C, Hale, L, Branas, C, Gallagher, R, **Killgore, WD**, Gehrels, J, Alfonso,-Miller, P, & Grandner, MA. Relationships between dietary supplement intake and sleep duration, insomnia, and fatigue. Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

490. Tubbs, A, Perlis, M, Chakravorty, S, Basner, M, **Killgore, WD**, Gehreles, J, Alfonso-Miller, P, & Grandner, MA. Does increased risk of suicide at night favor one method of suicide over another? Abstract presented at the SLEEP 2018 Annual Meeting, Baltimore, MD, June 2-6, 2018.

491. Huanjie, L, Gruber, S, Smith, SM, Lukas, SE, Silveri, M, Hill, KP, **Killgore, WD**, & Nickerson, LD. Combining multi-site/study MRI data: A novel linked-ICA denoising method for removing scanner and site variability from multi-modal MRI data. Abstract presented at the Joint Annual Meeting of ISMRM-ESMRMB, Paris, France, June 16-21, 2018. [*Trainee Stipend Award]

492. Bajaj, S, Raikes, AC, Alkozei, A, Dailey, NS, Vanuk, J, Satterfield, BC, & **Killgore, WD**. Suicidal ideation is associated with diminished cortical volume in a sub-clinical population. Abstract presented at the Organization for Human Brain Mapping (OHBM) Annual Meeting, Singapore, June 17-21, 2018.

493. Bajaj, S, Raikes, AC, Dailey, NS, Vanuk, J, Alkozei, A, Satterfield, BC, Weber, M, Rosso, IM, Rauch, SL, & **Killgore, WD**. Effect of blue light therapy on cortical volume, sleep, and anxiety symptoms following mild traumatic brain injury. Abstract presented at the Organization for Human Brain Mapping (OHBM)

Annual Meeting, Singapore, June 17-21, 2018.

494. Dailey, NS, Bajaj, S, Smith, R, Raikes, AC, Alkozei, A, & **Killgore, WD**. Disrupted functional connectivity and elevated aggression in young adults with mild traumatic brain injury. Abstract presented at the Organization for Human Brain Mapping (OHBM) Annual Meeting, Singapore, June 17-21, 2018.

495. Raikes, AC, Bajaj, S, Dailey, NS, Alkozei, A, Smith, R, & **Killgore, WD**. Post-mTBI white matter correlates of self-reported sleep quality: A DTI study. Abstract presented at the Organization for Human Brain Mapping (OHBM) Annual Meeting, Singapore, June 17-21, 2018.

496. Nickerson, LD, Li, H, , Silveri, MM, Lukas, SE, Hill, KP, **Killgore, WD**, & Gruber, SA. Multimodal MRI data fusion reveals structure-function patterns associated with chronic heavy marijuana use. Abstract presented at the Organization for Human Brain Mapping (OHBM) Annual Meeting, Singapore, June 17-21, 2018.

497. Raikes, AC, Satterfield, BC, Alkozei, A, & **Killgore, WD**. Blue light therapy improves self-reported sleep quality in individuals with a recent mild traumatic brain injury. Abstract presented at the Military Health Systems Research Symposium, Orlando, FL, August 20-23, 2018.

498. **Killgore, WD**. Executive functioning in individuals with mild traumatic brain injury is enhanced by daily morning blue light therapy. Abstract presented at the Military Health Systems Research Symposium, Orlando, FL, August, 20-23, 2018.

499. **Killgore, WD, &** Nickerson, LA. Why can't you just stay awake? Resistance to sleep deprivation is associated with measurable differences in brainstem gray matter. Abstract presented at the Military Health Systems Research Symposium, Orlando, FL, August 20-23, 2018.

500. Dailey, NS, Smith, R, Satterfield, BC, Raikes, AC, & **Killgore, WD**. Verbal fluency following mild traumatic brain injury: The strength of switching. Abstract presented at the American Speech-Language-Hearing Association Annual Convention, Boston, MA, November 15-17, 2018.

501. Forbeck, B, Dailey, NS, Esbit, S, & **Killgore, WD**. Reduced information processing speed: A dynamic deficit in mild traumatic brain injury. Abstract presented at the American Speech-Language-Hearing Association Annual Convention, Boston, MA, November 15-17, 2018.

502. Raikes, AC, Dailey, NS, & **Killgore, WD**. Neural and neurocognitive correlates of responsiveness to blue light therapy following mild traumatic brain injury. Abstract presented at the American Speech-Language-Hearing Association Annual Convention, Boston, MA, November 15-17, 2018.

503. Burns, AI, Ozcan, M, Shepard, KC, Alkozei, A, & **Killgore, WD**. The association between PTSD severity and life satisfaction is mediated by trait gratitude. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

504. Burns, AI, Shepard, KC, Ozcan, M, Alkozei, A, Vanuk, JR, & **Killgore, WD**. The association between morningness-eveningness and nightmares in PTSD. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

505. Dailey, NS, Meinhausen, C, & **Killgore, WD**. Self-initiated recall strategies in mild traumatic brain injury: Identifying the neural correlates. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

506. Esbit, S, Dailey, NS, & **Killgore, WD**. Making a list and checking it twice: Episodic verbal recall in mild traumatic brain injury. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

507. Esbit, S, LaFollette, K, Botello, R, Satterfield, BC, Alkozei, A, & **Killgore, WD**. High self-perceived adroitness: An altered perception of reality during sleep deprivation. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

508. **Killgore, WD**, Vanuk, JR, & Bajaj, S. Improving executive functioning in mild traumatic brain injury with daily morning blue light therapy. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

509. **Killgore, WD**, & Nickerson, LA. Vulnerability and resistance to sleep deprivation are associated with measurable differences in brainstem gray matter. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

510. LaFollette, K, Satterfield, BC, Lazar, M, & **Killgore, WD**. Predicting psychosocial stress reactivity from ability and trait-based emotional intelligence. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

511. LaFollette, K, Satterfield, BC, Lazar, M, & **Killgore, WD**. Stay negative? Positive affect is associated with increased psychosocial stress reactivity. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

512. Meinhausen, C, Dailey, NS, & **Killgore, WD**. Identifying memory retrieval strategies following a mild traumatic brain injury using the CVLT-II. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

513. Ozcan, M, Shepard, KC, Burns, AI, Alkozei, A, & **Killgore, WD**. Trait gratitude and the impact of daytime sleepiness on daily functioning predict PTSD severity over time. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

514. Raikes, AC, & **Killgore, WD**. Anterior cingulate gyrus volume predicts changes in post-mTBI daytime sleepiness following blue wavelength light therapy. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

515. Satterfield, BC, LaFollette, K, Lazar, M, & **Killgore, WD**. Prolonged psychosocial stress impairs cognitive flexibility. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

516. Shepard, KC, Burns, AI, Ozcan, M, Alkozei, A, & **Killgore, WD**. Racial differences regarding the effectiveness of blue light therapy in reducing PTSD severity. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

517. Shepard, KC, Ozcan, M, Burns, AI, Alkozei, A, Vanuk, JR, & **Killgore, WD**. Differences in anxiety reduction between minority and majority racial groups participating in morning blue light exposure. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

518. Vanuk, JR., Smith, R, Raikes, AC, Alkozei, A, Skalamera, J, & **Killgore, WD**. Ability based emotional intelligence is associated with greater cardiac vagal tone. Abstract presented at the Annual Meeting of the International Neuropsychological Society (INS), New York, NY, February 20-23, 2019.

519. Vanuk, JR, Shields, S, Slavich, M, & **Killgore, WD**. Lifetime stress exposure during adulthood is associated with lower trait-based emotional intelligence. Abstract presented at the Annual Meeting of the American Psychosomatic Society, Vancouver, BC, March 6-9, 2019.

520. Raikes, AC, Satterfield, BC, Grandner, MA, & **Killgore, WD**. Daily blue light therapy reduces persistent post-mild traumatic brain injury daytime sleepiness and post-concussion. Abstract presented at the Rocky Mountain Athletic Trainer's Association Annual Meeting, Phoenix, AZ, April 12, 2019.

521. Bajaj, S, Dailey, NS, Raikes, AC, Vanuk, JR, Weber, M, Rosso, IM, Rauch, SL, & **Killgore, WD**. Effect of blue light therapy on cortical volume and reaction time following mild TBI. Abstract presented at the Organization for Human Brain Mapping Annual Meeting, June 9-13, 2019.

522. Bajaj, S, Raikes, AC, & **Killgore, WD**. Water anisotropy within the default mode network predicts mod shifts following sleep deprivation. Abstract presented at the Organization for Human Brain Mapping Annual Meeting, June 9-13, 2019.

523. Bajaj, S, Raikes, AC, Razi, A, & **Killgore, WD**. Blue-wavelength light strengthens default mode network following mild TBI: A DCM-DTI study. Abstract presented at the Organization for Human Brain Mapping Annual Meeting, June 9-13, 2019.

524. Bajaj, S, & **Killgore, WD**. Sex differences in limbic and risk-taking propensity in healthy individuals. Abstract presented at the Organization for Human Brain Mapping Annual Meeting, June 9-13, 2019.

525. Raikes, AC, Satterfield, BC, Grandner, MA, & **Killgore, WD**. Daily blue light therapy reduces persistent post-mild traumatic brain injury daytime sleepiness and post-concussion. Abstract presented at the Rocky Mountain Athletic Trainer's Association Annual Meeting, Phoenix, AZ, April 12, 2019.

526. Raikes, AC., Athey, A, Alfonso-Miller, P, **Killgore, WD**, & Grandner, MA. Self-reported insomnia and daytime sleepiness increase athletes' sports-related concussion risk. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

527. Raikes, AC, Satterfield, BC, Bajaj, S, Grandner, MA, & **Killgore, WD**. Daily blue light therapy reduces daytime sleepiness and post-concussion symptoms after mild traumatic brain injury. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

528. Burns, AI, Shepard, KC, Ozcan, M, LaFollette, K, Alkozei, A, Vanuk, JR, Raikes, AC, Grandner, MA, & **Killgore, WD**. Gratitude and frequency of naps predict resilience for individuals with PTSD. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

529. Burns, AI, Ozcan, M, Shepard, KC, LaFollette, K, Alkozei, A, Grandner, MA, & **Killgore, WD**. The association between PTSD severity and insomnia is mediated by nightmares. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

530. Bajaj, S, Dailey, NS, Raikes, AC, Vanuk, JR, Grandner, MA, Weber, M, Rosso, IM, Rauch, SL, & **Killgore, WD**. Impact of light therapy on brain structure and simple reaction time following mild traumatic brain injury. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

531. Bajaj, S, Raikes, AC, Grandner, MA, & **Killgore, WD**. Quantitative anisotropy within the default-mode network predicts mood degradation following sleep-deprivation. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

532. Dailey, NS, Satterfield, BC, Raikes, AC, Strong, MJ, Forbeck, B, Grandner, MA, & **Killgore, WD**. Disrupted thalamocortical connectivity following mild traumatic brain injury: Associations with daytime sleepiness. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

533. Shepard, KC, Ozcan, M, Burns, AI, Grandner, MA, & **Killgore, WD**. Use of anger words in trauma narratives is negatively associated with sleep quality for single individuals with PTSD. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

534. Shepard, KC, Ozcan, M, Burns, AI, Vanuk, JR, Grandner, MA, Alkozei, A, & **Killgore, WD**. The relationships between psychopathology and sleep problems differe between racial minority groups. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

535. **Killgore, WD**, & Kamimori, GH. Can caffeine sustain attention and vigilance under prolonged monotonous conditions during 77 hours of total sleep deprivation? Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

536. **Killgore, WD,** Pace-Schott, Ozcan, M, Shepard, KC, Burns, AI, Grandner, MA, Vanuk, JR, & Alkozei, A. Morning blue light exposure improves sleep and fear extinction recall in PTSD. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

537. LaFollette, K, Satterfield, BC, Esbit, S, Lazar, M, Grandner, MA, & **Killgore, WD**. Negative mood and poor sleep are associated with altered moral reasoning under stress. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

538. LaFollette, KJ, Satterfield, BC, Esbit, S, Lazar, M, Grandner, MA, & **Killgore, WD**. The effects of prior at-home sleep duration on reversal-learning during a "shoot/no-shoot" task. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

539. Ozcan, M, Shepard, KC, Burns, AI, Raikes, AC, Dailey, NS, Alkozei, A, Grandner, MA, & **Killgore, WD**. Individuals with PTSD whose traumatic experiences occurred within the home have worse sleep outcomes. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

540. Ozcan, M, Shepard, KC., Burns, AI, Raikes, AC, Dailey, NS, Alkozei, A, Grandner, MA, & **Killgore, WD**. PTSD severity and use of negative emotion words in trauma narratives predict nightmares in individuals with PTSD. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

541. Satterfield, BC, Silveri, MM, Grandner, MA, & **Killgore, WD**. Baseline GABA levels predict time-on-task performance during sleep deprivation. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

542. Skalamera, J, Huang, YH, Chinkers, M, Richards, MM, & **Killgore, WDS**. The influence of habitual sleep duration on rational thinking ability. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

543. Bliznak, V, Perlis, ML, Ellis, J, Hale, L, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. What is the ideal bedtime? Data from a community sample. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

544. Lane, E, Ellis, J, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Sociodemographic, socioeconomic, and behavioral correlates of nightmare frequency in a community sample. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

545. Jajoo, A, Taylor-Pilliae, R, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Types of habitual physical activity associated with habitual sleep duration, sleep quality, and daytime sleepiness. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

546. Khader, W, Fernandez, F, Seizas, A, Knowlden, A, Ellis, J, Williams, N, Hale, L, Perlis, M, Jean-Louis, G, **Killgore, WD**, Alfonso-Miller, P, & Grandner, MA. What makes people want to make changes to their sleep? Assessment of perceived risks of insufficient sleep as a predictor of intent to improve sleep. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

547. Pham, B, Hale, L, St-Onge, M, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Habitual dietary quality associated with habitual sleep duration, insomnia, daytime sleepiness, and fatigue in a community sample. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

548. Begay, T, Gooneratne, N, Williams, N, Seixas, A, Jean-Louis, G, Gilles, A, **Killgore, WD**, Alfonso-Miller, P, & Grandner, MA. Sleep disparities in the United States and the impact of poverty. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

549. Griffen, N, Hale, L, Jean-Louis, G, **Killgore, WD**, Warlick, C, Alfonso-Miller, & Grandner, MA. Aspects of disordered neighborhoods are associated with insomnia, sleepiness, fatigue and control over sleep. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

550. Liang, O, Seixas, A, Parthasarathy, S, Jean-Louis, G, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Healthcare financial hardship and habitual sleep duration, impact on sleep disparities, and impact on the sleep-obesity relationship. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

551. Olivier, K, Perlis, ML, Troxel, W, Basner, M, Chakravorty, S, Tubbs, A, Owens, J, Jean-Louis, G, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Influence of likely nocturnal wakefulness on 24-hour patterns of violent crime in adults and juveniles. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

552. Featherston, B, Perlis, ML, Ellis, J, Williams, N, Jean-Louis, G, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. The concept of "satisfaction with sleep: Associations with sleep continuity, sleep quality, daytime sleepiness, and related concepts of overall health, stress, depression, and anxiety. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

553. Fourte, DA, Patterson, F, Malhotra, A, Seixas, A, **Killgore, WD**, Alfonso-Miller, P, & Grandner, MA. Should habitual sleep duration be added to the American Heart Association's "Life's Simple 7?" Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

554. Wills, C, Athey, A, Robbins, R, Patterson, F, Turner, R, **Killgore, WD**, Tubbs, A, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Chronotype and social support among student athletes: Impact on depressive symptoms. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

555. Ramsey, T, Athey, A, Ellis, J, Tubbs, A, Turner, R, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Dose-response relationships between insufficient sleep and mental health symptoms I collegiate student athletes and non-athletes. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

556. Quiroz, H, Chakravorty, S, **Killgore, WD**, Warlick, C, Alfonso-Miller, P, & Grandner, MA. Sleep-related determinants of habitual cannabis use, desire to use, and problematic use: Data from a community sample. Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

557. Warlick, C, Williams, N, Hale, L, **Killgore, WD**, Alfonso-Miller, P, & Grandner, MA. Is relationship satisfaction associated with habitual sleep? Abstract presented at the 2019 Annual Meeting of the Associated Professional Sleep Societies (SLEEP) Conference, San Antonio TX, June 8-12, 2019.

558. Ozcan, M, Burns, AI, Shepard, KC, & **Killgore, WD**. The relationship between combat and non-combat trauma and risk-taking propensity in individuals with PTSD. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

559. Esbit, S, Satterfield, BC, & **Killgore, WD**. Exploration of emotional intelligence and self-perceived invincibility. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

560. LaFollette, KJ, Satterfield, BC, & **Killgore, WD**. Self-perceived invincibility is associated with greater

cognitive flexibility. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

561. Strong, M, Esbit, S, LaFollette, KJ, Dailey, NS, & **Killgore, WD**. Big Five personality traits and how they relate to self-perceived invincibility. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

562. Shepard, KC, Ozcan, M, Burn, AI, Alkozei, A, & **Killgore, WD**. Blue light therapy differences in sleep quality improvement in military and civilian populations. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

563. Raikes, AC, Athey, A, Alfonso-Miller, P, **Killgore, WD**, & Grandner, MA. Moderate-to-severe self-reported insomnia and frequent daytime sleepiness increase athletes' risk for sustaining a sports-related concussion. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

564. Bajaj, S, Dailey, NS, Raikes, AC, Vanuk, JR, Weber, M, Rosso, IM, Rauch, SL, & **Killgore, WD**. Impact of blue-wavelength light therapy on cortical volume and simple reaction time following mild TBI. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

565. Raikes, AC, Satterfield, BC, Bajaj, S, Grandner, MA, & **Killgore, WD**. Daily administered blue light therapy reduces daytime sleepiness and improves somatic symptoms following mild traumatic brain injury. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

566. Burns, AI, Ozcan, M, Shepard, KC, Alkozei, A, Vanuk, JR, & **Killgore, WD**. The relationship between sleep onset latency and gratitude. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

567. LaFollette, KJ, Satterfield, BC, Esbit, S, Lazar, M, & **Killgore, WD**. Inadequate sleep quality and duration predicts disinhibited shooting on a "shoot/no shoot" task. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

568. Bajaj, S, & **Killgore, WD**. Sex differences in risk-taking behavior and brain morphometry in healthy individuals. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

569. Satterfield, BC, Silveri, MM, & **Killgore, WD**. Baseline GABA levels are associated with time-on-task performance during sleep deprivation. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

570. **Killgore, WD**, Ozcan, M, Shepard, KC, Burns, AI, Vanuk, JR, & Alkozei, A. Blue light exposure enhances sleep and fear extinction recall in PTSD. Abstract presented at the 2019 Military Health System Research Symposium, Kissimmee, FL, August 19-22, 2019.

571. LaFollette, K, Satterfield, BC, Lazar, M., **Killgore, WDS**. Disentangling the Effects of Subjective Task Load and Performance on Neuroendocrine Stress Response. Poster presented at the 49th Annual Society for Neuroscience Meeting, Chicago, IL, October, 2019.

572. Dailey, NS, & **Killgore, WD**. Disrupted thalamocortical connectivity following mild traumatic brain

injury: Associations with daytime sleepiness. Oral presentation at the American Speech-Language Hearing Association Conference, Orlando, FL, November, 2019.

573. Dailey, NS, & **Killgore, WD**. Reading fluency in mild traumatic brain injury. Poster presented at the American Speech-Language Hearing Association Conference, Orlando, FL, November, 2019.

574. Raikes, AC, Alkozei, A, Vanuk, JR, Bajaj, S, Satterfield, BC, & **Killgore, WD**. Blue light therapy reduces daytime sleepiness as well as depressive and somatic post-concussive symptoms following mild traumatic brain injury. Abstract accepted for Oral presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020. ***[*Winner of Nelson Butters Research Award for Best Paper by a Post-Doctoral Fellow]***.

575. Raikes, AC, Bajaj, S, Dailey, NS, Vanuk, JR, Alkozei, A, & **Killgore, WD**. Vestibular and emotional symptoms are associated with altered large-scale network resting stated functional connectivity after mild traumatic brain injury. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

576. Esbit, S, Satterfield, BC, LaFollette, K, Lazar, M, & **Killgore, WD**. Gender differences and overriding misleading impulses. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

577. Esbit, S, Raygoza, D, Meinhausen, C, Dailey, NS, & **Killgore, WD.** Exploring verbal recall throughout mild traumatic brain injury recovery. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

578. Meinhausen, C, Esbit, S, Dailey, NS, & **Killgore, WD**. Self-initiated verbal recall strategies following mild traumatic brain injury. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

579. Anlap, I, Esbit, S, Alkozei, A, Satterfield, BC, & **Killgore, WD**. The effects of gratitude on wellbeing are mediated by social support. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

580. Dailey, NS, Raikes, AC, Bajaj, S, Alkozei, A, Sanasac, S, & **Killgore, WD**. Frontal cortical surface area is associated with lexical-semantic knowledge in adults with mild traumatic brain injury. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

581. **Killgore, WD**, Burns, AI, Shepard, KC, Vanuk, JR, & Alkozei, A. Enhancing fear extinction recall in PTSD using blue light therapy. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

582. **Killgore, WD**, & Kamimori, GH. The effects of caffeine under monotonous conditions during prolonged total sleep deprivation. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

583. **Killgore, WD**, & Kamimori, GH. Trait extraversion is associated with increased suicidal ideation during sleep deprivation. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

584. Bullock, A, Burns, AI, Shepard, KC, Alkozei, A, & **Killgore, WD**. Alterations in cognitive symptoms of PTSD are correlated with somatic symptoms. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

585. Taylor, E, & **Killgore, WD**. Caffeine and emotional control. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

586. Taylor, E, & **Killgore, WD**. Emotionally intelligent early birds. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

587. Alkozei, A, Dailey, NS, Bajaj, S, Vanuk, JR, Raikes, AC, & **Killgore, WD**. The effects of blue wavelength light on subsequent amygdala-DLPFC connectivity at rest. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

588. Vanuk, JR, Raikes, AC, Alkozei, A, Shields, GS, Slavich, GM, & **Killgore, WD**. Lifetime stress exposure during adulthood is associated with lower emotional intelligence. Abstract accepted for Poster presentation at the 48th Annual Meeting of the International Neuropsychological Society, Denver CO, February 5-8, 2020.

589. LaFollette, K, Satterfield, BC, Lazar, M., **Killgore, WD**. The propensity for model-based control is associated with individual differences in risk behavior. Abstract submitted for presentation at the Computational and Systems Neuroscience (Cosyne) 2020 Meeting, Denver, CO, February, 2020.

590. Vanuk, JR, Alkozei, A, Burns, AI, Bullock, AD, & **Killgore, WD**. Sleep and fear extinction recall in PTSD improves with morning blue light exposure therapy. Abstract accepted for oral presentation at the 78th Annual Scientific Meeting of the American Psychosomatic Society, Long Beach, CA, March 11-14, 2020.

591. **Killgore, WD**, Burns, AI, Bullock, A, Vanuk, J, Taylor, E, Alkozei, A. Using blue light to consolidate fear extinction memory in PTSD. Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

592. **Killgore, WD**, & Kamimori, GH. Can caffeine sustain cognitive resilience during 77 hours of stressful total sleep deprivation? Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

593. **Killgore, WD**, Skalamera, J, Vanuk, J, Woods-Lubert, R, Cloonan, S, Alkozei, A, Dailey, N, Lane, R, Weihs, K, Allen, J, and Smith, R. Preliminary validation of a web-based emotional intelligence training program for enhancing emotional resilience. Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

594. **Killgore, WD,** & Kamimori, GH. Extraverts show increased suicidal ideation during sleep deprivation. Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

595. **Killgore, WD**, Cloonan, S, Woods-Lubert, R, Taylor, E, & Skalamera, J. Political perspective is associated with differences in trait anxiety and depression. Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

596. Alkozei, A, Dailey, NS, Bajaj, S, Vanuk, JR, Raikes, AC, & **Killgore, WD.** Acute blue wavelength light exposure influences functional brain connectivity. Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

597. Burns, A, Shepard, KC, Bullock, A, Esbit, S, Alkozei, A, Satterfield, B, & **Killgore, WD**. The association between life history strategy and anxiety is mediated by trait gratitude. Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

598. Bullock, A, Shepard, KC, Burns, A, Raikes, A, Alkozei, A, & **Killgore, WD**. Use of family words in trauma narratives predicts a higher risk of insomnia in individuals with PTSD. Abstract accepted for Poster presentation at the 40th Annual Conference of the Anxiety and Depression Association of America, San Antonio, TX, March 19-22, 2020.

599. **Killgore, WD**. Blue light therapy enhances sleep and fear extinction recall in PTSD. Symposium abstract accepted for presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

600. **Killgore, WD**, & Kamimori, GH. Extraversion and caffeine intake relate to suicidal ideation during sleep deprivation. Abstract accepted for Poster presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

601. **Killgore, WD**, Burns, AI, Bullock, A, Vanuk, JR, Taylor, E, & Alkozei, A. Morning blue light improves consolidation of fear extinction memory in PTSD. Abstract accepted for Poster presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

602. **Killgore, WD**, & Kamimori, GH. Effects of repeated dosing of caffeine on cognitive performance during prolonged sleep deprivation. Abstract accepted for Poster presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

603. Alkozei, A, Dailey, NS, Bajaj, S, Vanuk, JR, Raikes, AC, & **Killgore, WD**. Blue wavelength light and its effects on functional brain connectivity. Abstract accepted for Poster presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

604. Lucas, DA, Dailey, NS, & **Killgore, WD.** Implications for targeted interventions following mild traumatic brain injury: Post-concussion symptom severity predicts cognitive flexibility. Abstract accepted for Poster presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

605. Jecmen, D, King, R, Gould, J, Mitchell, J, Ralston, K, Alkozei, A, & **Killgore, WD**. The effect of blue light therapy on functional brain responses to masked fearful stimuli in post-traumatic stress disorder. Abstract accepted for Poster presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

606. King, R, Jecmen, D, Mitchell, J, Ralston, K, Gould, J, Burns, A, Bullock, A, Alkozei, A, & **Killgore, WD**. Co-morbid depressive symptoms are associated with reduced functional brain responses within the insula and visual cortex in response to masked happy faces in individuals with PTSD. Abstract accepted for Poster presentation at the 75th Annual Meeting of the Society of Biological Psychiatry, New York, NY, April 30-May 2, 2020.

607. Dailey, NS, Raikes, AC, Alkozei, A, Grandner, MA, & **Killgore WD**. Reduced cortical thickness as a biomarker of daytime sleepiness in mild traumatic brain injury. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

608. Dailey, NS, Raikes, AC, Wager, ME, Grandner, MA, Alkozei, WD. The compounding impact of daytime sleepiness and brain injury on sustained vigilance. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

609. Anlap, I, Taylor, E, Grandner, MA, & **Killgore, WD**. Gray matter volume of the rostral medial prefrontal cortex is associated with resilience to mood decline during overnight sleep deprivation. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

610. Raikes, AC, Dailey, NS, Alkozei, A, Vanuk, JR, Grandner, MA, & **Killgore, WD**. Daytime sleepiness, depression, and post-concussive symptoms improve following prescribed morning exposure to blue light. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

611. Raikes, AD, Dailey, NS, Vanuk, JR, Alkozei, A, Grandner, MA, **Killgore, WD**. Improved daytime sleepiness following daily morning blue light therapy is associated with altered resting-state network connectivity. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

612. Satterfield, BC, Anlap, I, Esbit, S, & **Killgore, WD**. Corticotropin-releasing hormone receptor 1 gene polymorphism modulates cognitive flexibility following acute stress and total sleep deprivation. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

613. Jecmen, D, King, R, Gould, J, Mitchell, J, Ralston, K, Burns, AI, Bullock, A, Grandner, MA, Alkozei, A, & **Killgore, WD**. The effects of morning blue light therapy on insomnia severity and PTSD symptoms in a clinical sample. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

614. Taylor, E, Grandner, MA, & **Killgore, WD**. Later bedtime is associated with differences in prefrontal gray matter volume and executive function deficit. Abstract submitted for Poster presentation at the 34th Annual

SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

615. Taylor, E, & **Killgore, WD**. Meta-analysis on the effects of caffeine on neurodegenerative cognitive decline. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

616. LaFollette, KJ, Satterfield, BC, Esbit, S, Lazar, M, Grandner, MA, & **Killgore, WD**. Emotion regulation during sleep deprivation and repeadted physiological stress: Implications for motor skill learning and production. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

617. King, R, Jecmen, D, Mitchell, J, Ralston, K, Gould, J, Burns, AI, Bullock, A, Grandner, MA, Alkozei, A, & **Killgore, WD**. Habitual sleep duration is negatively correlated with emotional reactivity within the rostral anterior cingulate cortex in individuals with PTSD. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

618. King, R, Jecmen, D, Alkozei, A, Raikes, A, Grandner, MA, & **Killgore, WD**. Hippocampal gray matter volume in healthy adult population is associated with habitual sleep duration. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

619. Burns, AI, Bullock, A, Taylor, E, Grandner, MA, Alkozei, A, & **Killgore, WD**. The association between sleep problems and risk-taking behavior differs between racial majority and minority groups. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

620. Burns, AI, Bullock, A, Raikes, AC, Dailey, NS, Grandner, MA, & **Killgore, WD**. Daytime sleepiness correlates with increased gray matter volume in the right middle temporal gyrus in healthy young individuals. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

621. **Killgore, WD**, Dailey, NS, Raikes, AC, Vanuk, John R, Taylor, E, Grandner, MA, & Alkozei, A. Blue light exposure enhances neural efficiency of the task positive network during a cognitive interference task. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

622. **Killgore, WD**, Dailey, NS, Raikes, AC, Vanuk, JR, Taylor, E, Grandner, MA, & Alkozei, A. Resilience to inhibitory deficits during sleep deprivation is predicted by gray matter volume in the ventromedial and ventrolateral prefrontal cortex. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

623. Bullock, A, Burns, A, Taylor, E, Grandner, MA, Miller, MM, Alkozei, A, & **Killgore, WD**. Self-referential language in trauma narratives predicts shorter sleep duration in women with PTSD. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

624. Vanuk, JR, Raikes, AC, Dailey, NS, Grandner, MA, & **Killgore, WD**. Grey matter volumetric differences are predictive of attentional lapses during sleep deprivation. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

625. Meinhausen, CE, Vanuk, JR, Grandner, MA, & **Killgore, WD**. Gray matter volume correlates of psychomotor vigilance speed during sleep deprivation. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

626. Kapoor, A, Perlis, M, Bastien, C, Williams, N, Hale, L, Branas, C, Barrett, M, **Killgore, WD**, Wills, CC, & Grandner, MA. Disassembling Associations between Insomnia and Anxiety Symptoms: Which Elements of Insomnia are Associated with Which Elements of Anxiety? Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

627. Ramsey, T, Athey, A, Auerbach, A, Turner, R, Williams, N, Jean-Louis, G, **Killgore, WD**, Wills, CC, & Grandner, MA. Sleep Duration and Symptoms Associated with Race/Ethnicity in Elite Collegiate Athletes. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

628. Piro, B, Garland, S, Jean-Pierre, P, Gonzalez, B, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. Sleep Duration and Sleep Timing Associated with History of Breast, Prostate, and Skin Cancer: Data from a Nationally-Representative Sample. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

629. Bombarda, A, St-Onge, M, Seixas, A, Williams, N, Jean-Louis, G, **Killgore, WD**, Wills, CC, & Grandner, MA. Sleep Duration and Timing Associated with Eating Behaviors: Data from NHANES 2015-2016. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

630. Abdi, H, Athey, A, Auerbach, A, Turner, R, **Killgore, WD**, Wills, CC, & Grandner, MA. College Football Players Compared to Other Collegiate Athletes: Symptoms of Insufficient Sleep Duration, Insomnia, and Sleep Apnea. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

631. Holbert, C, Bastien, C, Chakravorty, S, **Killgore, WD**, Wills, CC, & Grandner, MA. Hallucinogen Use Among College and University Students: Associations with Insufficient Sleep and Insomnia. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

632. Onyeonwu, C, Nowakowski, S, Hale, L, Branas, C, Barrett, M, **Killgore, WD**. Wills, CC, & Grandner, MA. Menstrual Regularity and Bleeding Associated with Sleep Duration, Sleep Quality, and Daytime Sleepiness in a Community Sample. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

633. Ghani, S, Delgadillo, ME, **Killgore, WD**, Wills, CC, & Grandner, MA. Culturally Consistent Diet Among Individuals of Mexican Descent at the US-Mexico Border Is Associated with Sleep Duration and Quality. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June

13-17, 2020.

634. Mason, B, Tubbs, A, Hale, L, Branas, C, Barrett, M, **Killgore, WD**, Wills, CC, & Grandner, MA. Use of Mobile Devices at Night Associated with Mental Health in Young Adults. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

635. Gozar, A, Seixas, A, Hale, L, Branas, C, Barrett, M, **Killgore, WD**, Wills, CC, Grandner, MA. Mobile Device Use in Bed and Relationships to Work Productivity: Impact of Anxiety. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

636. Barker, M, St-Onge, M, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. Dietary Macronutrients and Sleep Duration, Sleep Disturbance, and Daytime Fatigue. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

637. Phan, S, Perlis, ML, Hale, L, Branas, C, **Killgore, WD**, Wills, CC, & Grandner, MA. Reconsidering Stimulus Control: Activities in Bed Differentially Associated with Sleep-Related Outcomes. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

638. Grandner, MA, Tubbs, A, Jean-Louis, G, Seixas, A, Hale, L, Branas, C, **Killgore, WD**, & Wills, CC. Daytime Sleepiness in the Community: Implications for Sleep Health, Circadian Health, and Overall Physical Health. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

639. Begay, T, Tubbs, A, Jean-Louis, G, Hale, L, Branas, C, **Killgore, WD**, Wills, CC, & Grandner, MA. Demographic and Socioeconomic Implications of Excessive Daytime Sleepiness in the Community. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

640. Khader, WS, Tubbs, A, Fernandez, F, Chakravorty, S, Hale, L, Branas, C, Barrett, M, **Killgore, WD**, Wills, CC, & Grandner, MA. Community-Level Daytime Sleepiness and Substance Use: Implications of Sleep Time and Mental Health. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

641. Jajoo, A, Tubbs, A, Perlis, ML, Chakravorty, S, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. Population-Level Suicide Ideation: Impact of Combined Roles of Sleep Duration, Sleep Disturbance, and Daytime Sleepiness. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

642. Clay, MA, Athey, A, Charest, J, Auerbach, A, Turner, R, **Killgore, WD**, Wills, CC, & Grandner, MA. Team-Based Athletes Sleep Less than Individual Athletes, But Do Not Report More Insomnia or Fatigue. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

643. Grandner, MA, Fernandez, F, Khader, S, Jean-Louis, G, Seixas, A, Williams, N, **Killgore, WD**, & Wills, CC. Decline in Habitual Sleep Duration over 10 Years and Worsening Sleep Disparities: Data From NHIS

2006-2015. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

644. Villalobos, KM, Seixas, A, Williams, N, Jean-Louis, G, **Killgore, WD**, Wills, CC, & Grandner, MA. Disparities in Sleep Timing in the US: Data from the National Health and Nutrition Examination Survey 2015-2016. Abstract submitted for Poster presentation at the 34th Annual SLEEP Conference, Philadelphia, PA, June 13-17, 2020.

645. Valencia, LR, Bullock, A, Miller, M. Johnson, J, **Killgore, WD**. Incorporation of cardio exercise is associated to increased levels of gratitude among PTSD patients. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

646. Cloonan, S, Persich, M, Woods-Lubbert, RA, Smith, R, Skalamera, J, & **Killgore, WD**. Examining changes to perceived and ability emotional intelligence following emotional intelligence-specific training. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

647. Johnson, J., Anlap, I, Taylor, EC, Valencia, LR, Bullock, A, Swift, N, Wellman, C, Vanuk, J, & **Killgore, WD**. The association between anxiety and intelligence is moderated by sex. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

648. Persich, M, Cloonan, S, Woods-Lubbert, RA, Smith, R, Skalamera, J, & **Killgore, WD**. Emotional intelligence training and improvements to emotional regulation. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

649. Vanuk, J, Bullock, A, Forbeck, B, Dailey, NS, & **Killgore, WD**. Severity of PTSD symptoms is associated with greater levels of depression and deficits in short-term memory. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

650. **Killgore, WD**, Cloonan, S, Woods-Lubbert, RA, Vanuk, J, Persich, M, Dailey, NS, Strong, MJ, King, RJ, Lane, RD, & Smith, R. Enhancing emotional awareness with an online training program. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

651. **Killgore, WD**, Cloonan, S, Woods-Lubbert, RA, Vanuk, J, Persich, M, Dailey, NS, Strong, MJ, King, RJ, Lane, RD, and Smith, R. Training interoceptive awareness. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

652. **Killgore, WD**, Vanuk, J, Woods-Lubbert, RA, Cloonan, S, Persich, M, Dailey, NS, King, RJ, Strong, MJ, Lane, RD, and Smith, R. Can emotional resilience be trained? Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6,

2021.

653. **Killgore, WD**, Skalamera, J, Ozcan, M, Cloonan, S, Woods-Lubbert, RA, Persich, M, & Smith, R. Development and validation of the Interpersonal Affect Regulation Test (IPART). Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

654. Dailey, NS, Raikes, AC, Alkozei, A, Vanuk, J, & **Killgore, WD**. A shared biomarker of cognitive ability and sleep disruptions in mild traumatic brain injury. Abstract submitted for presentation at the Annual Meeting of the International Neuropsychological Society (INS), San Diego, CA, February 3-6, 2021.

655. Mason, BJ, Tubbs, AS, **Killgore, WD**, Fernandex, FX, & Grandner, MA. How much do blue-blockers block do block blue? Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

656. Bobadilla, V, Mason, BJ, Tubbs, AS, Fernandez, FX, **Killgore, WD**, & Grandner, MA. Blue blockers' ability to filter circadian-active light emitted from a tablet. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

657. Rupple, D, Mason, BJ, Tubbs, AS, Fernandex FX, **Killgore, WD**, & Grandner, MA. Spectrophotometric properties of 31 different commercially available blue blocking glasses under room lighting. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

658. Mason, BJ, Tubbs, AS, Fernandex, FX, **Killgore, WD**, & Grandner, MA. Spectrophotometric properties of commercial blue-blocking lenses in sunlight. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

659. Abdi, H, Kennedy, KE, **Killgore, WD**, Wills, CC, Charest, J, & Grandner, MA. Changes in physical activity during the COVID-19 pandemic associated with changes in sleep. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

660. Jajoo, A, Kennedy, KE, Lujan, M, **Killgore, WD**, Wills, CC, & Grandner, MA. Chanigni sleep during the COVID pandemic associated with daytime cognitive function. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

661. Ghani, SB, Kennedy, KE, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. Changes in sleep due to COVID pandemic associated with changes to dietary patterns. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

662. Wills, CC, Kennedy, KE, Bastien, C, Ruby, P, **Killgore, WD**, & Grandner, MA. Changes in dream recall during the COVID-19 pandemic: Associations with sleep, stress and dream content. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

663. Holbert, C, Kennedy, KE, **Killgore, WD**, Wills, CC, & Grandner, MA. Changes in sleep due to the COVID pandemic associated with sleep environment. Abstract submitted for presentation at the 35th

Annual SLEEP Conference, Virtual, June 10-13, 2021.

664. Lujan, M, Kennedy, KE, **Killgore, WD**, Wills, CC, & Grandner, MA. Sleep disturbance during the COVID-19 pandemic associated with worries and fears about possible infection. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

665. Kennedy, KE, Bastien, C, Ruby, P, **Killgore, WD**, Wills, CC, & Grandner, MA. Nightmare content during the COVID-19 pandemic: Influence of COVID-related stress and sleep disruption. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

666. VAnencia, D, Ghani, S, Delgadillo, ME, Madhivan, P, Krupp, K, Ruiz, J, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. COVID-19 pandemic sleep disturbances related to dietary behavior at the US-Mexico border. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

667. Isalva, L, Vanencia, D, Ghani, S, Delgadillo, ME, Bastien, C, Madhivan, P, Krupp, K, Ruiz, J, **Killgore, WD**, Wills, CC, & Grandner, MA. COVID-19 pandemic sleep and dreams at the US-Mexico border. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

668. Arce, R, Valencia, D, Ghani, S, Delgadillo, ME, Madhivan, P, Krupp, K, Ruiz, J, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. COVID-19 pandemic sleep changes related to social and financial impacts at the US-Mexico border. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

669. Begay, T, Valencia, D, Ghani, S, Delgadillo, ME, Bastien, C, Madhivan, P, Krupp, K, Ruiz, J, **Killgore, WD**, Wills, CC, & Grandner, MA. COVID-19 pandemic nightmares at the US-Mexico border. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

670. Begay, T, Valencia, D, Ghani, S, Delgadillo, ME, Madhivan, P, Krupp, K, Ruiz, J, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. COVID-19 pandemic sleep disturbances related to stress experiences at the US-Mexico border. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

671. Grandner, MA, Ruby, P, **Killgore, WD**, Kennedy, KE, Wills, CC. An election during a pandemic: Relationship between political affiliation and pandemic-related sleep and dreams. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

672. Kennedy, KE, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. Changes in sleep due to the COVID-19 pandemic associated with COVID-related general, financial, food, housing, family and relationship stress. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

673. Barker, M, Gilles, A, Ghani, S, **Killgore, WD**, Wills, CC, & Grandner, MA. Sociodemographic, behavioral, and health-related factors associated with sleep duration and quality among a nationally-representative sample of native Hawaiians and other Pacific Islanders. Abstract submitted for presentation

at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

674. Craig, C, Kennedy, KE, Perlis, ML, Seixas, A, **Killgore, WD**, Wills, CC, & Grandner, MA. Relationships between habitual sleep duration and chronic pain conditions in the US population over a 10-year period: Implications for sleep health disparities. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

675. Hanley, B, Gorovoy, S, Chamberlain, S, Bushan, B, Ghani, S, **Killgore, WD**, Wills, CC, & Grandner, MA. Parent and child sleep quality and nighttime activities. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

676. **Killgore, WD**, Cloonan, SA, Taylor, EC, Grandner, MA, & Dailey, NS. Insomnia as a risk for PTSD during the COVID-19 pandemic. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

677. **Killgore, WD**, Capaldi, VF, Grandner, MA, & Kamimori, GH. Trait extraversion is associated with increased suicidal ideation during total sleep deprivation and insomnia. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

678. Cloonan, SA, Grandner, MA, & **Killgore, WD**. Loneliness and lockdowns: The effects of the COVID-19 pandemic on insomnia symptoms. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

679. Janowski, S, Cloonan, SA, Grandner, MA, & **Killgore, WD**. Sleeping well during a pandemic: The role of various forms of social support in protecting against insomnia. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

680. Le, AJ, Dailey, NS, Grandner, MA, & **Killgore, WD**. Obstructive sleep apnea symptoms predict cognitive function following mild traumatic brain injury. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

681. Persich, M, Cloonan, SA, Grandner, MA, & **Killgore, WD**. Self-reported sleep and resilience. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

682. Persich, M, Cloonan, SA, Grandner, MA, & **Killgore, WD**. Sleep quality and duration are associated with greater trait emotional intelligence. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

683. Taylor, EC, Cloonan, SA, Grandner, MA, & **Killgore, WD**. Insomnia in those diagnosed with COVID-19. Abstract submitted for presentation at the 35th Annual SLEEP Conference, Virtual, June 10-13, 2021.

684. Cloonan, SA, Persich, MR, & **Killgore, WD**. Resilience mediates the effect of actual and perceived emotional intelligence on depression. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

685. **Killgore, WD**, Silveri, MM. Finding the secret recipe for good sleep: Clues from brain neurochemistry. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

686. **Killgore, WD**, & Capaldi, VF (II). Extraversion is associated with increased suicidal ideation during sleep deprivation. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

687. **Killgore, WD**, Dailey, NS, Vanuk, JR, & Raikes, AC. Morning blue light therapy for sleep and cognitive deficits following mild traumatic brain injury. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

688. **Killgore WD**, Ralston, KN, King, R, Dailey, NS, & Alkozei, A. Enhancing cognitive brain functions via light stimulation. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

689. **Killgore, WD**, Persich, MR, Cloonan, SA, Vanuk, JR, Dailey, NS, & Smith, R. Development and validation of a military emotional intelligence training program for enhancing emotional resilience. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

690. **Killgore, WD**, & Cloonan, SA. Increasing aggression during the COVID-19 lockdowns. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

691. Ralston, KN, King, R, Bullock, A, Alkozei, A, & **Killgore, WD**. Blue light therapy for sleep latency in individuals with PTSD: Sex differences. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

692. Satterfield, BC, Anlap, I, Esbit, S, LaFollette, KI, Lazar, M, & **Killgore, WD**. Corticotropin-releasing hormone receptor 1 gene polymorphism modulates cognitive flexibility following acute stress and total sleep deprivation. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

693. Persich, MR, Cloonan, SA, & **Killgore, WD**. Enhancing interoceptive awareness and dispositional mindfulness through a military emotional intelligence training program. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

694. Dailey, NS, Raikes, AC, Forbeck, BS, & **Killgore, WD**. Predicting neurocognitive function from structural neurocircuitry following mild traumatic brain injury. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26, 2021.

695. Dailey, NS, Le, AJ, & **Killgore, WD**. Identifying the relationships between post-concussion symptom severity, fractional anisotropy and neurocognitive function following mild traumatic brain injury. Abstract submitted to the Military Health Systems Research Symposium, 2021. Kissimmee, FL, August 23-26,

2021.

AWARDED GRANTS AND CONTRACTS

Completed

2001-2003 fMRI of Unconscious Affect Processing in Adolescence.
NIH, 1R03HD41542-01
PI: **Killgore** ($79,000.)

2003-2006 The Effects of Sleep-Loss and Stimulant Countermeasures on Judgment and Decision Making.
U.S. Army Medical Research and Materiel Command (USAMRMC) Competitive Medical Research Proposal Program (CMRP); Intramural Funding,
PI: **Killgore** (Total Award:

2004-2005 Sleep/wake Schedules in 3ID Aviation Brigade Soldiers.
Defense Advanced Research Projects Agency
(DARPA) PI: **Killgore** (Total Award:)

2005-2006 Functional Neuroimaging Studies of Neural Processing Changes with Sleep and Sleep Deprivation.
U.S. Army Medical Research and Materiel Command (USAMRMC); Intramural Funding
Task Area C (Warfighter Judgment and Decision Making) Program Funding
PI: **Killgore** (Total Award:)

2006-2007 Establishing Normative Data Sets for a Series of Tasks to Measure the Cognitive Effects of Operationally Relevant Stressors.
U.S. Army Medical Research and Materiel Command (USAMRMC); Intramural Funding
Task Area C (Warfighter Judgment and Decision Making) Program Funding,
PI: **Killgore** (Total Award:)

2006-2007 Military Operational Medicine Research Program (MOM-RP), Development of the Sleep History and Readiness Predictor (SHARP).
U.S. Army Medical Research and Materiel Command (USAMRMC); Intramural
Funding PI: **Killgore** (Total Award:)

2009-2014 The Neurobiological Basis and Potential Modification of Emotional Intelligence through Affective Behavioral Training (W81XWH-09-1-0730).
U.S. Army Medical Research and Materiel Command
(USAMRMC), PI: **Killgore** (Total Award:

Major Goal: To identify the neurobiological basis of cognitive and emotional intelligence using functional and structural magnetic resonance imaging.

2011-2016 Effects of Bright Light Therapy on Sleep, Cognition, and Brain Function following Mild Traumatic Brain Injury (W81XWH-11-1-0056).
U.S. Army Medical Research and Materiel Command (USAMRMC),
PI: **Killgore** (Total Award:)
Major Goal: To evaluate the effectiveness of morning exposure to bright light as a treatment for improving in sleep patterns among individuals with post-concussive syndrome. Effects of improved sleep on recovery due to this treatment will be evaluated using neurocognitive testing as well as functional and structural neuroimaging.

2012-2014 Neural Mechanisms of Fear Extinction Across Anxiety Disorders
NIH NIMH
PI: Milad, M. Site Subcontract PI: **Killgore** (Subcontract Award:)
Major Goal: To examine the neurocircuitry involved in fear conditioning, extinction, and extinction recall across several major anxiety disorders.

2012-2014 Multimodal Neuroimaging to Predict Cognitive Resilience Against Sleep Loss
Defense Advance Research Projects Agency (DARPA) Young Faculty Award in Neuroscience (D12AP00241)
PI: **Killgore** (Total Award:)
Major Goal: To combine several neuroimaging techniques, including functional and structural magnetic resonance imaging, diffusion tensor imaging, and magnetic resonance spectroscopy to predict individual resilience to 24 hours of sleep deprivation.

2012-2015 Internet Based Cognitive Behavioral Therapy Effects on Depressive Cognitions and Brain function (W81XWH-12-1-0109).
U.S. Army Medical Research and Materiel Command (USAMRMC),
PI: Rauch, SL; Co-PI: **Killgore** (Total Award:)
Major Goal: To evaluate the effectiveness of an internet-based cognitive behavioral therapy treatment program on improving depressive symptoms, coping and resilience skills, cognitive processing and functional brain activation patterns within the prefrontal cortex.

2015 Effects of Blue Light on Melatonin Levels and EEG Power Density Spectrum
Arizona Area Health Education Centers (AHEC) Program
Co-PI: Alkozei, A.; Co-PI: **Killgore** (Total Award:)
Percent Effort: 0%
Major Goal: Adjunctive intramural funding to add a melatonin collection to an ongoing study of the effects of blue wavelength light on alertness and brain function.

Current

2012-2020 A Model for Predicting Cognitive and Emotional Health from Structural and Functional Neurocircuitry following Traumatic Brain Injury (W81WH-12-0386)
Congressionally Directed Medical Research Program (CDMRP), Psychological Health/Traumatic Brain Injury (PH/TBI) Research Program: Applied Neurotrauma Research Award.
PI: **Killgore** (Total Award:)
Percent Effort: 25%

Major Goal: To evaluate the relation between axonal damage and neurocognitive performance in patients with traumatic brain injury at multiple points over the recovery trajectory, in order to predict recovery.

2014-2019 Bright Light Therapy for Treatment of Sleep Problems following Mild TBI (W81XWH-14-1-0571).
Psychological Health and Traumatic Brain Injury Research Program (PH/TBI RP) Traumatic Brain Injury Research Award-Clinical Trial.
PI: **Killgore** (Total Award:)
Percent Effort: 40%
Major Goal: To verify the effectiveness of morning exposure to bright light as a treatment for improving in sleep patterns, neurocognitive performance, brain function, and brain structure among individuals with a recent mild traumatic brain injury.

2014-2020 A Non-pharmacologic Method for Enhancing Sleep in PTSD (W81XWH-14-1-0570)
Military Operational Medicine Research Program (MOMRP) Joint Program Committee 5 (JPC-5), FY13 Basic and Applied Psychological Health Award (BAPHA)
PI: **Killgore** (Total Award:)
Percent Effort: 35%
Major Goal: To evaluate the effectiveness of blue light exposure to modify sleep in PTSD and its effects on fear conditioning/extinction, symptom expression, and brain functioning.

2016-2020 Refinement and Validation of a Military Emotional Intelligence Training Program (JW150005)
Joint Warfighter Medical Research Program 2015
PI: **Killgore** (Total Award:)
Percent Effort: 45%
Major Goal: To develop and validate a new internet-based training program to enhance emotional intelligence capacities in military Service Members.

2017-2019 Emotional State and Personality: A Proof-of-Concept Model for Predicting Performance Under Stress (DM160347)
USAMRMC 2015
PI: **Killgore** (Total Award:)
Percent Effort: 20%
Major Goal: To develop a statistical model to predict effective cognitive performance under stress using personality and state emotion metrics.

2018-2020 Understanding the Mechanisms of Blue Light Exposure on Cognitive Performance
USAMRDC
PI: **Killgore** (Total Award:)
Percent Effort: 4%
Major Goal: To identify the subcortical systems responsible for acute cognitive improvement associated with blue light exposure in the scanner.

2020-2022 Transcranial Magnetic Stimulation of the Default Mode Network to Improve Sleep
USAMRDC

PI: **Killgore** (Total Award:
Percent Effort: 5%
Major Goal: Determine whether continuous theta burst stimulation of the default mode network can improve sleep among individuals with insomnia.

2020 Real-Time Caffeine Optimization during Total Sleep Deprivation
USAMRDC
Site PI: **Killgore** (Total Award:
Percent Effort: 40%
Major Goal: Determine the effectiveness of the 2B-Alert Caffeine Optimization Program during an in-laboratory sleep deprivation study.

A Non-pharmacologic Method for Enhancing Sleep in PTSD

Log Number A-18333

W81XWH-14-1-0570

PI: William D. Killgore, Ph.D. **Org:** University of Arizona **Award Amount:** $3,823,700

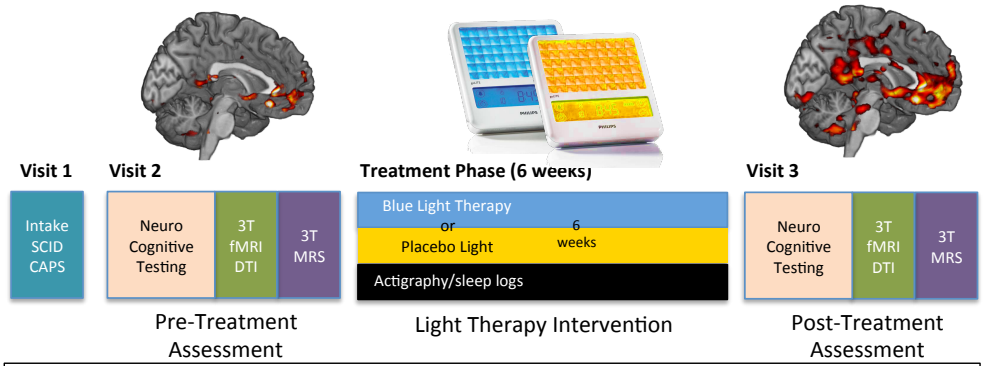
Study Aims

- **Objective 1**: Demonstrate effectiveness of blue wavelength light therapy for *improving sleep* in combat vets with PTSD.
- **Objective 2**: Link improved sleep with increased *extinction recall* following fear conditioning in PTSD.
- **Objective 3**: Link improved sleep with reduced symptom presentation, improved mood, and psychological resilience.
- **Objective 4**: Link improved sleep and cognitive/emotional changes with changes in brain functioning and neurochemistry using fMRI and magnetic resonance spectroscopy.

Approach

Test the effectiveness of a 6-week blue light therapy program based on clinical outcomes, fear conditioning/extinction, neurocognitive assessment, functional magnetic resonance imaging (fMRI), and neurochemistry changes. 90 individuals with PTSD will be randomly assigned to blue light (BL) or amber placebo light (PL) therapy.

6-week Treatment (N = 84; n = 44 blue; n = 40 amber)



Accomplishment: Data collection complete. Final report complete. Blue light improves total sleep time, enhances prefrontal activation, facilitates retention of fear extinction learning, and may be useful as an adjunctive method to facilitate gains from ongoing treatment.

Timeline and Total Cost (direct and indirect)

Activities	FY15	FY16	FY17	FY18	FY19	FY20	FY21
Preparation: Local IRB; USAMRMC HRPO; Program Development; Materials Acquisition; Training							
Data Collection: 90 participants complete 6-week blue or placebo light TX program, including pre- and post-TX assessments/scans							
Data Analysis: fMRI, MRS, clinical, behavioral, and cognitive data will be analyzed; manuscripts prepared							
Estimated Total Budget ($K)	942	968	983	931	0	0	0

Updated: JUL 27 2021

Goals/Milestones

FY15 Goal – Study Preparation
☑ Obtain Materials, complete IRB approvals
FY16 Goal – Recruitment and Data Collection
☑ Run development scans, begin recruitment
FY18 Goal – Continue Data Collection
☑Complete at least 60% of data collection
☑Conduct Preliminary Analysis
FY19 Goal – Continue Data Collection and Analysis
☑Continue data collection to 75%
FY20 Goal – Complete Data Collection and Analysis
☑Revised due to COVID-19: Close study to new recruitment at n = 84
☑Break blind and analyze data
☑Publish findings and submit final report

Budget Expenditure to Date

Projected Expenditure: $3,824K
Actual Expenditure: $3,824K