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14. ABSTRACT
The emotional Stroop task with combat-related words was shown to be a robust and sensitive measure of attentional bias to trauma-relevant material in OEF/OIF Veterans with PTSD. It shows promise as an objective behavioral test that might be able to distinguish between OEF/OIF combat Veterans with a PTSD diagnosis and those without. However, the results should be interpreted with caution until a sufficiently large control group of demographically-matched Veterans is tested. In addition, the present group of OIF/OEF Veterans with mild TBI and/or PTSD were impaired at inhibiting inappropriate motor responses, which can have important implications for daily life. Increased levels of impulsivity and a decreased ability to filter out distracting and emotionally intrusive information can negatively impact social and occupational functioning. In the future, computerized training interventions that target emotional and cognitive control skills may assist these OEF/OIF Veterans in returning to their previous levels of productivity. The carefully-designed computerized tasks implemented in this project may be more accurate in assessing the cognitive and affective sequelae of TBI and PTSD than self-report questionnaires.

15. SUBJECT TERMS
Cognitive Functioning, Traumatic Brain Injury, Post-Traumatic Stress Disorder

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Table of Contents

Page

INTRODUCTION: Combat veterans who have sustained a traumatic brain injury (TBI) can show impairments in behavioral and cognitive control and increases in impulsivity. In addition, many with mild TBI will also have post-traumatic stress disorder (PTSD). To improve diagnostic capabilities and better define treatment alternatives, it is important to determine the unique (and shared) contributions of each disorder to deficits in cognitive function and emotional control. Three specific control functions are being targeted: (1) **resolving conflict** between competing responses and competing aspects of a visual display; (2) **monitoring for errors** in performance and adjusting behavior accordingly; (3) **multi-tasking**, or the ability to maintain adequate performance in dual task situations. Converging evidence is obtained through the combined use of behavioral testing, electrophysiological recording (event-related potentials, ERPs), and structural imaging (diffusion tensor imaging, DTI). The project applies innovative methods by expanding the application of ERPs into the cognitive and behavioral domains most troublesome for patients with TBI and PTSD.

BODY: In the first year of the project, we enrolled 18 patients and 4 demographically-matched military control subjects in our project and tested them on the first in our series of computer-based experiments that evaluate reaction time, cognitive processing, and emotional reactivity. In addition, we collected self-report information from 3 questionnaires. Because it has been difficult to recruit Veterans without either PTSD or mild TBI to serve as controls, we have also tested 8 civilian control subjects. The research accomplishments associated with each task outlined in the approved Statement of Work are summarized below.

Project Timeline and Milestones	
	Year 1
Patient Recruitment	ongoing
Matched Controls	4
TBI only	1
PTSD only	6
TBI + PTSD	11
Pilot Studies	Exp. 1-2
Behavioral Testing	Exp. 1

Phase 1: Patient Recruitment: We enrolled 18 patients (all Veterans) into the study during the first year of the project (all male, mean age = 33 yrs). Of these, 12 had suffered one or more mild TBIs or probable TBIs (i.e., concussions) based on standard criteria from, e.g., the American Congress of Rehabilitative Medicine (ACRM, 1993) and WHO (Von Holst & Cassidy, 2004), as accepted by the VA and the DoD (see http://www.pdhealth.mil/TBI.asp). Seventeen of the 18 Veterans enrolled in the project had received a PTSD diagnosis. Thus, of the three originally proposed patient groups, there are 11 in the TBI+PTSD group, 6 with PTSD only, and 1 with TBI only. We have been unsuccessful in recruiting a cohort of mTBI patients without PTSD. This is an issue that affects all investigators working with similar groups of OIF/OEF Veterans. The concern is whether an adequate sample of Veterans with mild TBI only, with no PTSD, can be found. In our experience thus far, most of the patients who meet the selection criteria for mild TBI (mTBI) also have a formal PTSD diagnosis. Our colleagues inform us that the same is true at the other major VANCHCS site in Sacramento. In addition, disagreement on the exact mTBI diagnostic criteria (both across and within sites) complicates the classification of enrolled

patients. Furthermore, the definition of mTBI is under discussion at the moment (Hoge et al., 2009), and we are closely monitoring this debate. In addition to the patients, we have recruited 4 demographically matched controls (male Veterans, mean age = 31). We are stepping up our efforts to recruit an adequate number of Veteran control subjects. Finally, participants completed 3 standardized questionnaires: the Barratt Impulsiveness Scale (BIS), the PTSD Checklist – Military (PCL-M), and the Beck Depression Inventory (BDI).

One goal of the current project is to combine MRI and EEG brain imaging methods with carefully designed behavioral tasks to improve patient diagnosis. To this end, our collaborator, Dr. And Turken, has obtained DTI data from 5 of the patients as part of his VA Career Development Award project. Data collection and data analysis in his project are ongoing.

Phase 2: Pilot Studies: The next behavioral experiment to be conducted in Year 2 is the color word Stroop task, which was adapted from the design of Ashley and Swick (2004). Color congruent (e.g., **RED**), color incongruent (**BLUE**), and neutral (**CLOCK**) words will be presented in separate blocks to match the design of the emotional Stroop task (Exp. 1). This paradigm is ready to be tested in several pilot subjects before moving to the patient groups. Regarding the electrophysiological experiments, we had hoped to have a substantial amount of ERP data at this point in the project, but there was a delay in starting these studies in a timely fashion. This is because our new 64-channel amplifier system, which was ordered through VA purchasing in August 2008, arrived in April 2009. We tried to remedy any further delay in beginning our EEG experiments by revamping our old EEG recording system, which has proven to be more difficult than initially imagined due to a software upgrade that is not entirely backwardly compatible with the old program. Nonetheless, we were able to record some pilot data for Experiment 2 (see Fig. 1).

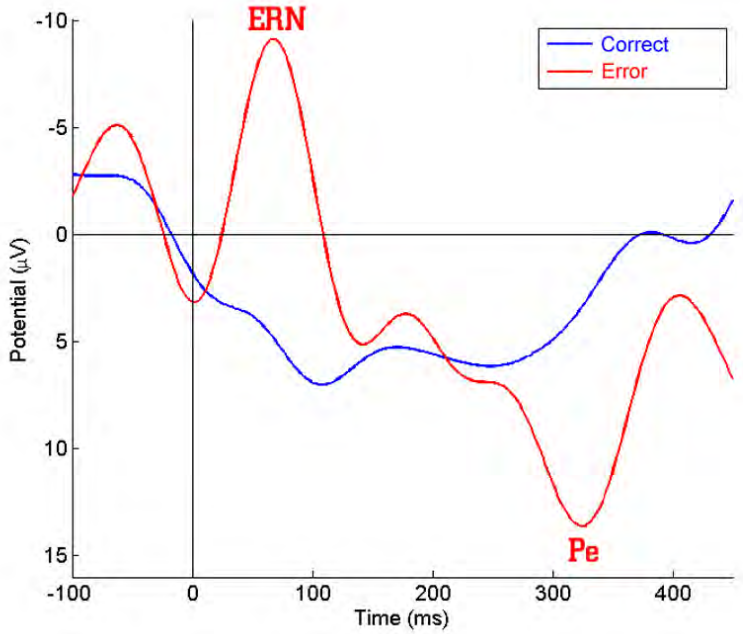

Fig. 1 – Error-related negativity (ERN) and error positivity (Pe) from a pilot subject in the change-signal interference task. These ERPs (from the frontal midline electrode Fz) were time-locked to response onset (correct trials in blue, error trials in red). Negative is plotted upwards.

The plot above shows the averaged ERPs from a civilian control subject in the change-signal interference task, which is related to Stroop-type interference tasks and response inhibition tasks such as the Go/NoGo (Swick et al., 2008). The ERN and Pe components are associated with the commission of errors in choice reaction time tasks. We previously demonstrated that patients with moderate to severe TBI showed significant reductions in the amplitude of the ERN and in error correction performance, while Pe was intact (Turken & Swick, 2008).

Phase 3: Behavioral Testing: Testing and data analysis in the emotional Stroop task (Exp. 1) are ongoing and will be completed during Year 2. The Go/NoGo task is another executive control task that provides a measure of response inhibition. Results from these studies are summarized below.

Experiment 1 – Emotional Stroop task with Combat-Related Words:

This experiment was designed to be an objective behavioral measure that may be able to distinguish between combat veterans with a PTSD diagnosis and those without. It is a variant of the color word Stroop task, in which participants name the font color of words presented on the screen while ignoring the words themselves. In our current paradigm, the words are presented in blocks of negative emotional words, positive emotional words, combat-related words, and appropriately matched neutral words. The metrics of interest are reaction times (RTs) for naming the color of combat words relative to neutral words, as the former are thought to divert attention away from the primary task in Veterans with PTSD. We also tested 8 pilot subjects (civilians) on Exp. 1. They are matched with the patient group for age, but not for other demographic factors. Thus, these civilian subjects are not meant to serve as a control group for the patients. Nevertheless, we present their data below as a preliminary comparison to the patient group.

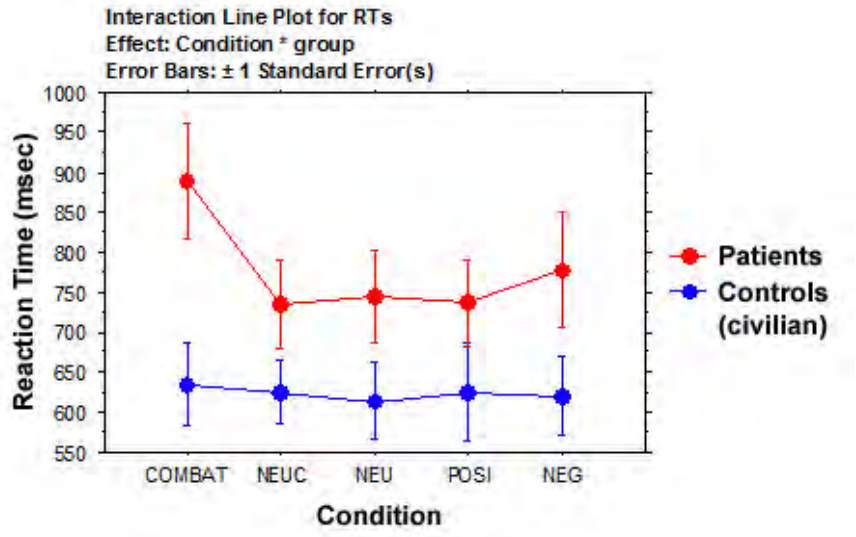

Fig. 2 – Color naming reaction time for the five different stimulus conditions: com = combat-related words; neuc = neutral words matched to combat; neu = neutral words matched to negative words; pos = positive emotional words; neg = negative emotional words.

Although the patients tended to be slower than the controls overall (Fig. 2), only the condition by group interaction reached significance [$F(4,80)=3.51$, $p<.02$]. This was due to a clear emotional Stroop effect (slowing of RTs) for combat-related words in the PTSD patient group [main effect

of condition: F(4,52)=10.76, p<.0001], but not in the controls [F(4,28)=.08]. Pairwise comparisons of combat-related words vs. matched neutral words revealed a highly significant effect for the PTSD patients (p<.0001), but not for civilian control subjects (p>.8). Conversely, comparing the RTs for non-combat negative words (e.g., TORNADO, POISON, CONTEMPT) vs. neutral words (RETIRED, PENCIL, CABBAGE) did not yield a significant emotional Stroop effect in either the patients (p=.24) or the controls (p=.87). Some prior studies have observed such an effect in non-clinical populations (e.g., Ashley & Swick, 2009), but many have not (reviewed in Phaf & Kan, 2007; Williams et al., 1996).

The most important finding is the combat-specific emotional Stroop effect in the OEF/OIF Veterans with PTSD. Previous studies have demonstrated the emotional Stroop effect in clinical populations, in which words related to an area of concern for an individual (i.e., snakes or spiders for phobics) elicit slower response times than neutral or even other emotional words (Williams et al., 1996). In comparison to previous studies on PTSD, the mean size of the interference effect that we observed (153 msec) is considered quite large (Shin et al., 2001; Wingenfeld et al., 2009), even relative to the combat Stroop study of Constans et al. (2004). The analyses above included the 14 OIF Veterans with a formal diagnosis of PTSD. Four others were not included in the group: one OIF Veteran found the test too upsetting and had to discontinue, one OEF Veteran was not diagnosed with PTSD, and two others were from earlier conflicts. Since the critical stimulus list included combat-related words specific to OEF/OIF (e.g., FALLUJA, KANDAHAR, MARTYR, IED), we included these latter patients in a group with three Veteran control subjects (the fourth had missing data due to a computer glitch). A main effect of condition was not observed in this military group [F(4,20)=.49, p=.5], nor was the combat vs. neutral word comparison significant, p=.22. However, the power to detect such a difference was low with n=6. Nonetheless, the difference in RT between combat and neutral words was calculated to provide a preliminary comparison between the PTSD and control groups (Fig. 3).

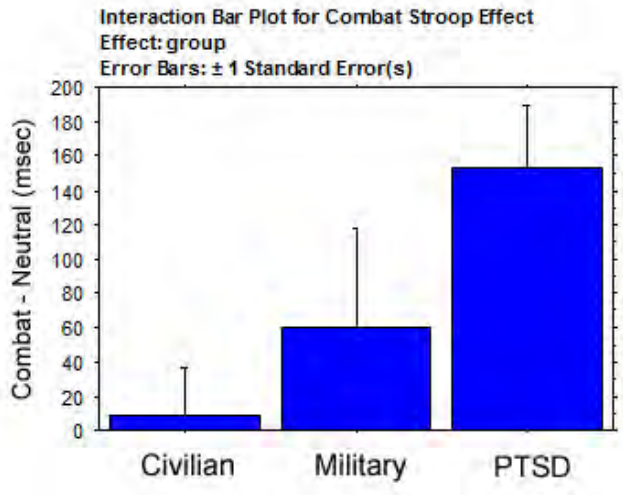

Fig. 3 – Size of the emotional Stroop effect for combat-related words, calculated as the differences in response times for naming the color of combat words minus neutral words (in msec).

There was an effect of group [F(2,25)=3.74, p<.05], with a significant difference between civilian controls and PTSD patients (p<.02), but not between military controls and PTSD patients (p=.14). Again, the power to detect the latter difference is low, and a firmer conclusion awaits the recruitment of an equivalent number of demographically-matched control participants.

Although the patient subgroup numbers are small at this stage of the project, there was no suggestion that Veterans with TBI+PTSD differed from Veterans with PTSD only on this task. In addition, there was no correlation between the size of the combat Stroop effect and scores on the PTSD Checklist – Military (PCL-M), or scores on the Beck Depression Inventory (BDI). Although very preliminary, this task shows promise as a more objective measure of PTSD symptomology.

Go/NoGo Task – Motor Response Inhibition:

This task measures a person's ability to inhibit an inappropriate response, a key function attributed to the frontal lobes and a major component of executive control (Miyake et al., 2000). Single letters were rapidly presented on a computer screen, and subjects were instructed to respond as quickly as possible to any letter except "X," the NoGo stimulus. The difficulty of the task was manipulated by altering the probability of "Go" trials relative to "NoGo" trials, i.e., 50% Go trials vs. 90% Go trials (with 50% NoGo vs. 10% NoGo, respectively). Performance measures (error rates and RTs) from the patient group (n=18) were initially compared to those from an age-matched civilian control group (n=8) who were part of another study. All participants made more errors on the difficult condition [$F(1,24)=64.26$, $p<.0001$], when the need to inhibit responses was rare (Fig. 4). The patients were significantly impaired on this task overall, committing more errors in both conditions [$F(1,24)=12.88$, $p<.002$]. Furthermore, "Go" probability interacted with group [$F(1,24)=10.99$, $p<.003$], such that the patients were impaired to a greater extend on the difficult condition, indicative of an impulsive response style. There were no significant differences between the groups on RTs (p's>.3), suggesting that a speed-accuracy trade-off in the patients cannot account for their deficit.

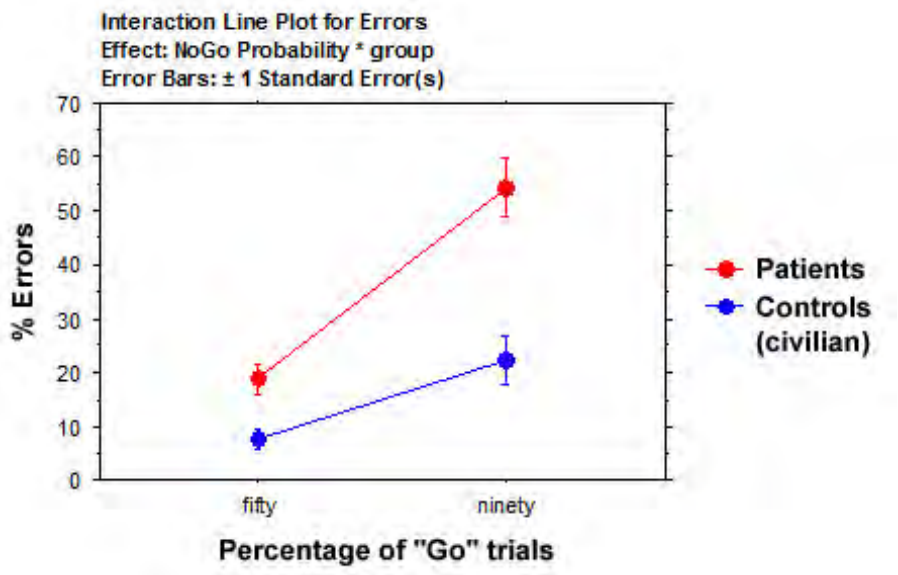

Fig. 4 – Percentage of errors on the GoNoGo task for both conditions (which were presented in separate blocks). The "fifty" condition means that "Go" trials requiring a button press response occurred on 50% of the trials, and the "ninety" condition means that "Go" trials occurred on 90% of the trials.

Although the subgroup numbers are still small at this stage of the project, there was no indication that Veterans with TBI+PTSD (n=11) made more mistakes on this task than Veterans with PTSD

only (n=6). There was only one patient with mild TBI without PTSD in our patient pool. However, Nelson and colleagues (2009) found that OEF/OIF Veterans with mTBI+PTSD performed worse than those with mTBI without PTSD on speed of processing and executive function tasks.

In the present group of Veterans, self-rated impulsivity on the Barratt Impulsiveness Scale (BIS) did not correlate with performance on either the 50% Go (r=.27) or the 90% Go conditions (r=.05). The total BIS scores for 10 of 18 patients placed them in the high impulsive range, with 3 more at the border. Of the 9 patients with the most errors, 7 were able to gauge their level of impulsivity in an accurate manner. However, 6 of the 9 better performers rated themselves in the high impulsive or high normal range. The motor subscale of the BIS might be a better predictor of Go/NoGo errors, but there was no correlation with error rates on either the 50% Go (r=.39, p=.11) or the 90% Go conditions (r=.05). Interestingly, previous GoNoGo results in TBI patients have been mixed. Some papers have reported deficits (Robertson et al., 1997), while others have not (Whyte et al., 2006). We recently reported that a group of moderate to severe TBI patients with lesions to orbitofrontal cortex were not impaired in this task (Swick et al., 2008). On the other hand, civilians with PTSD (and no TBI) showed an increased error rate and reduced recruitment of frontal cortical regions in a neuroimaging study of response inhibition (Falconer et al., 2008).

Our prior work (Swick et al., 2008) also demonstrated that stroke patients with focal lesions in the left inferior frontal gyrus showed a pattern of impairment similar to that reported here. However, the present group of OIF/OEF Veterans had an even greater deficit in motor response inhibition, which can have important implications for daily life. A major caveat is that we have recruited only 4 military control participants, and while their performance is numerically more accurate than the patients, it was not significantly so with such a small n. Thus, we urge caution in interpreting these results until comparisons are made with a sufficiently large military control group. Nevertheless, the Go/NoGo task provides a measure of response inhibition that is more objective than self-reported evaluations of behavioral tendencies.

KEY RESEARCH ACCOMPLISHMENTS:

- Enrolled 18 OEF/OIF Veterans with PTSD and/or mTBI into the study.
- Demonstrated that the emotional Stroop task with combat-related words is a robust and sensitive measure of attentional bias to trauma-relevant material in OEF/OIF Veterans with PTSD.
- The specificity of the emotional Stroop task in relating to PTSD symptomology remains to be seen, however, pending comparison to a larger group of OEF/OIF Veterans without PTSD or TBI.
- Found that OEF/OIF Veterans with PTSD and/or mTBI. exhibited an impulsive response style in a Go/NoGo task that measures the ability to inhibit inappropriate responses.
- Submitted an abstract on these findings to the Military Health Research Forum.

REPORTABLE OUTCOMES:

Abstract

Swick D, Ashley V, Pratt N, Larsen J, & Justus T. Attentional Bias and Response Inhibition in Veterans with Post-Traumatic Stress Disorder and Traumatic Brain Injury. Abstract to be presented at the Military Health Research Forum, Aug 31 – Sept 3, 2009.

Presentations

October 14, 2008: Neurobehavioral Brown Bag Lunch (NBBL) at VANCHCS in Martinez.

October 27, 2008: Neurobiology, Physiology, and Behavior faculty seminar series at the University of California, Davis.

March 22, 2009: Poster presented at the Annual Meeting of the Cognitive Neuroscience Society in San Francisco.

Related Publications - This work was funded by the PI's VA Merit grant and is directly relevant to the present DoD project:

Ashley, V., & Swick, D. (2009). Consequences of emotional stimuli: Age differences on pure and mixed blocks of the emotional Stroop. *Behavioral and Brain Functions* 5:14.

Swick, D., Ashley, V., & Turken, A. U. (2008). Left inferior frontal gyrus is critical for response inhibition. *BMC Neuroscience* 9:102.

Turken, A. U., & Swick, D. (2008). The effect of orbitofrontal lesions on the error-related negativity. *Neuroscience Letters* 441:7-10.

CONCLUSIONS: The emotional Stroop test shows promise as an objective behavioral measure that may be able to distinguish between OEF/OIF combat Veterans with a PTSD diagnosis and those without. However, these results should be interpreted with caution until a sufficiently large control group of demographically-matched Veterans is tested. In addition, the present group of OIF/OEF Veterans had a substantial deficit in motor response inhibition, which can have implications for daily life. Increased levels of impulsivity and a decreased ability to filter out distracting and emotionally intrusive information can negatively impact social and occupational functioning. In the future, computerized training interventions that target emotional and cognitive control skills may assist these OEF/OIF veterans in returning to their previous levels of productivity. The carefully-designed computerized tasks implemented in this project may be more accurate in assessing the cognitive and affective sequelae of TBI and PTSD than self-report questionnaires.

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WORD LISTS: Combat Emotional Stroop

COMBAT	MATCHED NEUTRAL	NEUTRAL	POSITIVE	NEGATIVE
1. SHELL	1. ROUNDED	1. CHAIR	1. RICHES	1. CRISIS
2. EVACUATE	2. DELHI	2. RETIRED	2. OUTDOORS	2. TORNADO
3. IED	3. PDA	3. FEATHERS	3. LOYAL	3. CUT
4. GUNFIRE	4. LISBON	4. CABINET	4. GLORY	4. USELESS
5. DECAPITATE	5. CAIRO	5. WINDMILL	5. FESTIVE	5. DUMP
6. FALLUJA	6. QUOTE	6. FOOT	6. CHAMPION	6. SIN
7. SEVERED	7. CAPSULE	7. SPINNING	7. FANTASY	7. MAD
8. MILITANT	8. FIELDWORK	8. AIR	8. BRIGHT	8. DELAYED
9. APC	9. RIDE	9. SHORTER	9. HUMOR	9. PENALTY
10. VEST	10. ANTENNA	10. UMBRELLA	10. LIBERTY	10. JEALOUSY
11. PATROL	11. DINING	11. WINDOW	11. CAR	11. HURT
12. MOUT	12. MOVE	12. SAFE	12. MERRY	12. LOSER
13. INSURGENT	13. PASTRY	13. ELBOW	13. DIAMOND	13. SNAKE
14. CONCUSSION	14. UNDEFINED	14. BASKET	14. PUPPY	14. PITY
15. EXPLOSIVE	15. BISHOP	15. GOLFER	15. INSPIRED	15. WICKED
16. BAGHDAD	16. TRUNK	16. RESERVED	16. COZY	16. THIEF
17. MEDIC	17. NBA	17. SLOW	17. HOPEFUL	17. SICKNESS
18. TERROR	18. BRISTOL	18. MILK	18. JUSTICE	18. HORROR
19. MARTYR	19. BOOKLET	19. COTTAGE	19. TALENT	19. STUPID
20. EXECUTE	20. GOSSIP	20. DOOR	20. STRONG	20. INSULT
21. KIRKUK	21. SENIORS	21. OBESITY	21. AMBITION	21. DEBT
22. TRIGGER	22. DAMASCUS	22. FARM	22. TRUTH	22. RUDE
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24. BODY	24. MILAN	24. POSTER	24. DINNER	24. HIT
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26. GUNMEN	26. ROOFING	26. MOMENT	26. TROPHY	26. BROKEN
27. COMBAT	27. EXPERT	27. SILK	27. SAVIOR	27. ARROGANT
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29. KIDNAP	29. CITY	29. NEIGHBOR	29. SAPPHIRE	29. DAMAGE
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31. MORTAR	31. CHIANTI	31. LAMP	31. HONOR	31. CRUDE
32. TALIBAN	32. NET	32. DIRT	32. DEVOTED	32. DREADFUL
33. SHRAPNEL	33. SHIPMAN	33. PENCIL	33. GIFT	33. POISON
34. PRISONER	34. PARIS	34. COMFORT	34. APPLAUSE	34. CONTEMPT
35. SNIPER	35. WEEK	35. SQUARE	35. BRAVE	35. BLIND
36. KILL	36. ATHENA	36. BOY	36. STAR	36. FEVER
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38. CONVOY	38. HOUSING	38. GENTLE	38. CHAMP	38. INSANE
39. WOUNDED	39. BISCUIT	39. QUART	39. CUTE	39. FILTH
40. KANDAHAR	40. DISHWASHER	40. FINGER	40. IDEA	40. DIVORCE
41. AIRLIFT	41. CONSUME	41. SALAD	41. TERRIFIC	41. OFFEND
42. EXPLODE	42. TAPESTRY	42. TABLE	42. VICTORY	42. LAWSUIT
43. TOUR	43. RENOVATE	43. CORRIDOR	43. JOLLY	43. ROACH
44. CHECKPOINT	44. DVD	44. SPHERE	44. MOTHER	44. SLAVE
45. GUNNER	45. PERMIT	45. CAT	45. CAKE	45. RIDICULE
46. HADITHA	46. ENGULF	46. VIOLIN	46. ADMIRED	46. STINK
47. APACHE	47. NAIROBI	47. BORED	47. PRESTIGE	47. FAT
48. CAVES	48. AUDUBON	48. MIXTURE	48. DOG	48. RAT
49. KMTC	49. FACULTY	49. PERIODIC	49. HOLIDAY	49. TERRIBLE
50. PROJECTILE	50. JURORS	50. STAYING	50. CHEER	50. FOUL
51. CAPTIVE	51. SKIING	51. CYLINDER	51. JOY	51. REJECTED
52. DETAINEE	52. BLVD	52. SOLEMN	52. DOLLAR	52. PRESSURE

53. HV	53. CONDIMENT	53. RUSTY	53. SUNRISE	53. BANKRUPT
54. FIREFIGHT	54. UNIFYING	54. JELLY	54. IMPROVE	54. LOST
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56. CROSSFIRE	56. JAKARTA	56. RELAXED	56. HONEST	56. GARBAGE
57. ZARQAWI	57. OBSERVER	57. HAY	57. CHILD	57. SCORN
58. RPG	58. DNA	58. BATHROOM	58. LOVED	58. STARVING
59. BEHEAD	59. STAIRCASE	59. SLEEP	59. FRIENDLY	59. CONFUSED
60. MOSUL	60. RESUMED	60. THOROUGH	60. SILLY	60. FLOOD
61. CAPTOR	61. DETECTIVE	61. BUS	61. MUSIC	61. TROUBLE
62. AMPUTATE	62. RSVP	62. CABBAGE	62. EAT	62. ROTTEN
63. MUQTADA	63. VINE	63. PLANT	63. HEAL	63. ILLNESS
64. SUICIDE	64. COMETS	64. STAPLES	64. TREASURE	64. SICK
65. WARFARE	65. TENOR	65. ARRANGE	65. LEARN	65. DROWN
66. MULLAH	66. SHORTHAND	66. ITEM	66. FAME	66. TROUBLED
67. KABUL	67. UV	67. HABIT	67. EXERCISE	67. BURN
68. BLINDFOLD	68. COMPLEXION	68. PAMPHLET	68. GRIN	68. CORRUPT
69. AMBUSH	69. SITTER	69. SYMBOLS	69. ADORABLE	69. RABIES
70. KALASHNIKOV	70. BESTOW	70. BOWL	70. TRAVEL	70. JAIL
71. HOSTAGE	71. EXAMINE	71. PACKETS	71. LUSCIOUS	71. SELFISH
72. CASUALTY	72. NEWSROOM	72. HISTORY	72. BLOSSOM	72. INSECURE
73. WARLORD	73. THUNDER	73. BUTTER	73. DANCER	73. MISERY
74. MILITIA	74. SCUBA	74. WAGON	74. TOY	74. HELPLESS
75. CHU	75. APPALACHIANS	75. SEAT	75. LUCKY	75. DISASTER
76. ABDUCT	76. MOSCOW	76. MUSEUM	76. SNOW	76. CRIME
77. ROADSIDE	77. JUANITA	77. BED	77. LAUGHTER	77. TRAGEDY
78. VBIED	78. PERUSE	78. PERFORMS	78. MAGICAL	78. DESTROY
79. WEAPON	79. PURITAN	79. CURTAINS	79. SUN	79. ALONE
80. TORTURE	80. CADDIE	80. SHY	80. BABY	80. HATRED
81. BOMB	81. TENANT	81. BUILDING	81. JOYFUL	81. SLIME
82. WMD	82. NFL	82. TOWER	82. SONG	82. FRAUD
83. BASRA	83. PARTISAN	83. HORSE	83. PLEASURE	83. MOLD
84. GUN	84. REDECORATE	84. SLUSH	84. COMEDY	84. LIE

Some of the above words are from the rated words in Affective Norms for English Words (ANEW).
See:
Bradley, M. M., & Lang, P. J. (1999). Affective norms for English words (ANEW): Instruction manual and affective ratings. Technical Report C-1, The Center for Research in Psychophysiology, University of Florida.

BIS 11

Name_____ Date_____

#	
Non Planning Score	
Motor Score	
Attentional Score	
# of sessions	

Directions: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and place a check in the appropriate box on the right side of the page. Do not spend too much time on any statement. Answer quickly and honestly.		**Rarely/Never**	**Occasionally**	**Often**	**Almost always/ Always**
1.	I plan tasks carefully				
2.	I do things without thinking				
3.	I am happy-go-lucky				
4.	I have "racing" thoughts				
5.	I plan trips well ahead of time				
6.	I am self-controlled				
7.	I concentrate easily				
8.	I save regularly				
9.	I find it hard to sit still for long periods of time				
10.	I am a careful thinker				
11.	I plan for job security				
12.	I say things without thinking				
13.	I like to think about complex problems				
14.	I change jobs				
15.	I act "on impulse"				
16.	I get easily bored when solving thought problems				
17.	I have regular medical/dental checkups				
18.	I act on the spur of the moment				
19.	I am a steady thinker				
20.	I change where I live				
21.	I buy things on impulse				
22.	I finish what I start				
23.	I walk and move fast				
24.	I solve problems by trial-and-error				
25.	I spend or charge more than I earn				
26.	I talk fast				
27.	I have outside thoughts when thinking				
28.	I am more interested in the present than the future				
29.	I am restless at lectures or talks				
30.	I plan for the future				

Barratt Impulsivity Scale (BIS-11)
Measures general level of impulsivity
Public domain

Dr. Barratt developed this in research efforts with various prison populations and in working privately with outpatients that had problems with explosive episodes. Other studies have looked at the instrument in more general terms of impulsivity. To my knowledge it has not been standardized on the "normal" population. If impulsivity was a problem cited by the individual, I would expect to see a decrease in the score with successful treatment. Could be also used during course of treatment to check progress.

SCORING KEYS

Score equals the sum of the values associated with each check mark.

	ATTENTIONAL KEY	**Rarely/Never**	**Occasionally**	**Often**	**Almost always/ Always**
4.	I have "racing" thoughts	**1**	**2**	**3**	**4**
7.	I concentrate easily	**4**	**3**	**2**	**1**
10.	I am a careful thinker	**4**	**3**	**2**	**1**
13.	I like to think about complex problems	**4**	**3**	**2**	**1**
16.	I get easily bored when solving thought problems	**1**	**2**	**3**	**4**
19.	I am a steady thinker	**4**	**3**	**2**	**1**
24.	I solve problems by trial-and-error	**1**	**2**	**3**	**4**
27.	I have outside thoughts when thinking	**1**	**2**	**3**	**4**

	MOTOR KEY				
2.	I do things without thinking	**1**	**2**	**3**	**4**
6.	I am self-controlled	**4**	**3**	**2**	**1**
9.	I find it hard to sit still for long periods of time	**1**	**2**	**3**	**4**
12.	I say things without thinking	**1**	**2**	**3**	**4**
15.	I act "on impulse"	**1**	**2**	**3**	**4**
18.	I act on the spur of the moment	**1**	**2**	**3**	**4**
21.	I buy things on impulse	**1**	**2**	**3**	**4**
23.	I walk and move fast	**1**	**2**	**3**	**4**
26.	I talk fast	**1**	**2**	**3**	**4**
29.	I am restless at lectures or talks	**1**	**2**	**3**	**4**

	NON-PLANNING KEY				
1.	I plan tasks carefully	**4**	**3**	**2**	**1**
3.	I am happy-go-lucky	**1**	**2**	**3**	**4**
5.	I plan trips well ahead of time	**4**	**3**	**2**	**1**
8.	I save regularly	**4**	**3**	**2**	**1**
11.	I plan for job security	**4**	**3**	**2**	**1**
14.	I change jobs	**1**	**2**	**3**	**4**
17.	I have regular medical/dental checkups	**4**	**3**	**2**	**1**
20.	I change where I live	**1**	**2**	**3**	**4**
22.	I finish what I start	**4**	**3**	**2**	**1**
25.	I spend or charge more than I earn	**1**	**2**	**3**	**4**
28.	I am more interested in the present than the future	**1**	**2**	**3**	**4**
30.	I plan for the future	**4**	**3**	**2**	**1**

Attentional _____ Motor _____ Non-Planning _____ Total _____

PCL-M

Instructions: Below is a list of problems and complaints that veterans sometimes have in response to stressful military experiences. Please read each one carefully, then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

	Not at all	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
1. Repeated, disturbing *memories, thoughts, or images* of a stressful military experience?	1	2	3	4	5
2. Repeated, disturbing *dreams* of a stressful military experience?	1	2	3	4	5
3. Suddenly *acting or feeling* as if a stressful military experience *were happening again* (as if you were reliving it)?	1	2	3	4	5
4. Feeling *very upset* when *something reminded you* of a stressful military experience?	1	2	3	4	5
5. Having *physical reactions* (e.g., heart pounding, trouble breathing, sweating) when *something reminded you* of a stressful military experience?	1	2	3	4	5
6. Avoiding *thinking about or talking about* a stressful military experience or avoiding *having feelings* related to it?	1	2	3	4	5
7. Avoiding *activities or situations* because *they reminded you* of a stressful military experience?	1	2	3	4	5
8. Trouble *remembering important parts* of a stressful military experience?	1	2	3	4	5
9. *Loss of interest* in activities that you used to enjoy?	1	2	3	4	5
10. Feeling *distant or cut off* from other people?	1	2	3	4	5
11. Feeling *emotionally numb* or being unable to have loving feelings for those close to you?	1	2	3	4	5
12. Feeling as if your *future* somehow will be *cut short*?	1	2	3	4	5
13. Trouble *falling or staying asleep*?	1	2	3	4	5
14. Feeling *irritable* or having *angry outbursts*?	1	2	3	4	5
15. Having *difficulty concentrating*?	1	2	3	4	5
16. Being "*superalert*" or watchful or on guard?	1	2	3	4	5
17. Feeling *jumpy* or easily startled?	1	2	3	4	5

PCL-M for DSM-IV (11/1/94) Weathers, Litz, Huska, & Keane National Center for PTSD - Behavioral Science Division