AWARD NUMBER: W81XWH-16-1-0062

TITLE: Refinement and Validation of a Military Emotional Intelligence Training Program

PRINCIPAL INVESTIGATOR: William D. "Scott" Killgore, Ph.D.

RECIPIENT: University of Arizona
Tucson, AZ 85719

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PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

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The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.
The goal of the proposed project is to provide the Army with a brief, well-validated, internet-based training program for enhancing Emotional Intelligence (EI) and resilience skills. Addressing this need is crucial, as military personnel are often required to serve under dangerous and emotionally stressful conditions. Prolonged stress or exposure to very intense lifethreatening experiences, such as those encountered in combat or other hazardous duty deployments, can increase the risk of developing mental health problems including depression, anxiety, or post-traumatic stress disorder (PTSD). One possible way to minimize the effects of these stressful experiences on Service members is to strengthen their emotional flexibility, adaptability, and capacity to cope with adversity before they find themselves faced with such situations. To fill this need, we propose to provide the military with a web-based program that focuses on enhancing Emotional Intelligence (EI), a core set of trainable emotional skills that collectively include the capacity to understand, perceive, control, and use emotions effectively.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>04</td>
</tr>
<tr>
<td>2. Keywords</td>
<td>05</td>
</tr>
<tr>
<td>3. Accomplishments</td>
<td>05</td>
</tr>
<tr>
<td>4. Impact</td>
<td>14</td>
</tr>
<tr>
<td>5. Changes/Problems</td>
<td>15</td>
</tr>
<tr>
<td>6. Products</td>
<td>16</td>
</tr>
<tr>
<td>7. Participants &amp; Other Collaborating Organizations</td>
<td>17</td>
</tr>
<tr>
<td>8. Special Reporting Requirements</td>
<td>20</td>
</tr>
<tr>
<td>9. Appendices</td>
<td>21</td>
</tr>
</tbody>
</table>
1. INTRODUCTION: Narrative that briefly (one paragraph) describes the subject, purpose and scope of the research.

The goal of this project is to provide the Army with a brief, well-validated, internet-based training program for enhancing Emotional Intelligence (EI) and resilience skills. Addressing this need is crucial, as military personnel are often required to serve under dangerous and emotionally stressful conditions, oftentimes with limited support from friends and family for prolonged periods of time. Prolonged stress or exposure to intense life-threatening experiences, such as those encountered in combat or other hazardous duty deployments, can increase the risk of developing mental health problems including depression, anxiety, or post-traumatic stress disorder (PTSD). One possible way to minimize the effects of these stressful experiences on Service members is to enhance understanding of emotional processes and strengthen their emotional flexibility, adaptability, and capacity to cope with adversity before they find themselves faced with such situations. Accordingly, the goal of the present investigation is to provide the military with a web-based program that focuses on enhancing Emotional Intelligence (EI), a core set of trainable emotional skills that collectively include the capacity to understand, perceive, control, and use emotions effectively to solve problems and reach long-term goals. The present study is designed into 5 sequential Task Projects that will lead to the accomplishment of this goal, providing a fully developed and validated program for enhancing EI skills. Task 1 involves fleshing out the details of the proposed EI Training program with a group of experts in emotional theory and clinical intervention; Task 2 involves web-based design, programming, development, and iterative refinement of the program; Task 3 involves an efficacy study to determine the overall effects of the program and attempt to determine the optimal training schedule for use with the program; Task 4 will involve identifying the neural brain changes that occur when participants undergo the optimal version of the program; Task 5 will involve testing the effectiveness of the program for enhancing leadership and emotional skills in ROTC cadets during the summer Leader Development Course (LDAC); Task 6 will involve testing the effectiveness of the program for minimizing mental health issues in a sample of active duty military personnel during deployment or other stressful training exercise.

Timeline: 4 year study
2. **KEYWORDS:** Provide a brief list of keywords (limit to 20 words).

   Emotional intelligence, affect, training, web-based, resilience, neuroimaging.

3. **ACCOMPLISHMENTS:** The PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency Grants Officer whenever there are significant changes in the project or its direction.

   **What were the major goals of the project?**

   According to the Statement of Work (SOW), the following major tasks were proposed:

   **Major Task 1:** Retooling of Preliminary EI Training Program (Y1: Q1-3)
   *Completed:* reconceptualization of the program has been completed.

   **Major Task 2:** Iterative Refinement of EI Training Program (Y1: Q3-4, Y2: Q1)
   *In progress:* internet-based training modules have been designed and rough drafts are complete. Programing and refinement of the modules is currently ongoing.

   **Major Task 3:** Efficacy/Training Duration (Y2, Y3, Y4)
   *Pending:* awaiting completion of development and refinement of modules.

   **Major Task 4:** Identify Neuromechanisms (Y2, Y3, Y4)
   *Pending:* awaiting data collection of Tasks 2 and 3.

   **Major Task 5:** ROTC Leader Development and Assessment Course (Y2, Y3, Y4)
   *Pending:* awaiting data collection completion of Tasks 2-4.

   **Major Task 6:** Military Unit Training/Deployment (Y2, Y3, Y4)
   *Pending:* awaiting data collection completion of Tasks 2-5.

   **Major Task 7:** Process and Analyze Data
   *Pending:* awaiting data collection completion of Tasks 2-6.

   **What was accomplished under these goals?**

   *For this reporting period describe: 1) major activities; 2) specific objectives; 3) significant results or key outcomes, including major findings, developments, or conclusions (both positive and negative); and/or 4) other achievements. Include a discussion of stated goals not met. Description shall include pertinent data and graphs in sufficient detail to explain any significant results achieved. A succinct description of the methodology used shall be provided. As the project progresses to completion, the emphasis in reporting in this section should shift from reporting activities to reporting accomplishments.*
1) Major Activities: Work completed in Year 1 has focused on two major goals: 1) study preparation and 2) initial design and development of the training program.

Preparatory activities involved hiring 3 new Research Technicians, a Study Coordinator, several undergraduate volunteer Research Assistants, and ensuring that all personnel were fully trained on all laboratory procedures and study specific procedures. Required equipment was acquired throughout Year 1, including Zephyr® Biopatches, various assessments and scales, and 7 rugged laptops. The computer hardware and software were obtained and checked for optimal use and ability to yield valid data. An online platform for data management, REDCap, was outfitted for the purposes of this study and extensively tested and refined to meet the study’s needs after practice sessions were run and weaknesses identified.

During Year 1 of this project we have focused extensive effort on content and visual design of the modules for the Emotional Intelligence (EI) program. During this reporting period, the PI held regular meetings with several experts in emotion theory and clinical interventions. During these meetings, the team addressed the previously identified weaknesses in the pilot EI Training program and identified new strategies to implement in the current revision of the program. Once the general content areas were re-conceptualized, we hired a computer programming/web-training developer to assist in translating the content into an interactive internet training program. Throughout the year, our faculty collaborators, postdoctoral fellows, graduate student, research technicians, and study coordinator have actively worked on a near daily basis with the web development company to design new content for the program that will be interesting, engaging, and relevant for Service members. In Quarter 3, we tested out several aspects of content and made modifications to the program based on 4 iterative runs of the program. This resulted in enrollment of 40 participants. By the end of Year 1, we have translated the type of content we would like to include in our program into interactive and game-like scenarios and activities, some of which are currently under development or have been fully completed.

Specific Objectives: The primary objectives were to redesign the preliminary EI training program, and conceptualize, create, and iteratively refine the new EI training program.

2) Significant Results/Key Outcomes:

Training Program Development: We have made significant strides in finalizing the computer EI Training program. All major conceptual components have been redesigned. We have developed an organizational structure for the EI Training Program. Table 1 below outlines the general content areas of the program structure. The program itself is currently designed to involve approximately 12 hours of training content. This content is organized into seven major training domains, including 1) Foundational Knowledge of Emotions, 2) Knowing One’s Own Emotions, 3) Motivation, 4) Managing Emotions, 5) Knowing others Emotions, 6) Managing Others’ Emotions; 7) Empathy.
The program modules are designed in a 3-tier organization structure. As shown in Figure 1 below, Tier 1 is focused on introducing the program, grounding emotional concepts in physiology (i.e., understanding how emotions are related to body sensations), self-efficacy, goal setting, and familiarizing the student with the Emotion Tracker (ET). This tier is linear in approach and requires the participant to complete all lessons in a prescribed order. Upon graduation to Tier 2, the student is introduced to the main ideas of EI, including the concepts of relaxation, mindfulness, and cognitive distortions (a.k.a., “thinking traps”). During this tier, the student is permitted greater flexibility in the order in which content areas are explored and learned. Finally, upon graduation to Tier 3, the student then gets the opportunity for greater self-exploration, with deeper dives into specific content areas with practice and improvement toward goals.

<table>
<thead>
<tr>
<th>Overarching Program Goal</th>
<th>Objective(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundational Knowledge of Emotions</td>
<td>Describe the function and value of experiencing emotions</td>
</tr>
<tr>
<td></td>
<td>Explain the physiological underpinnings of emotion</td>
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<td></td>
<td>Discuss how context informs emotional response</td>
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<tr>
<td>Knowing one's own emotions</td>
<td>Differentiate emotions within the emotional dictionary.</td>
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<td></td>
<td>Recognize and label their own emotions.</td>
</tr>
<tr>
<td>Motivation</td>
<td>Remember the potential benefits (interpersonal) of the ability to regulate</td>
</tr>
<tr>
<td></td>
<td>Remember the potential hazard (PTSD) of the inability to regulate emotions.</td>
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<tr>
<td>Managing Emotions</td>
<td>Demonstrate motivation for practice in mindfulness.</td>
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<tr>
<td></td>
<td>Recall the components of mindfulness.</td>
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<tr>
<td></td>
<td>Identify own cognitive distortions</td>
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<tr>
<td></td>
<td>Reframe cognitive distortions</td>
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<tr>
<td></td>
<td>Recognize the state of mind (lense) from which they’re acting</td>
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<tr>
<td></td>
<td>Identify different types of emotion avoidance strategies they use</td>
</tr>
<tr>
<td></td>
<td>Understand the consequences of emotion avoidance</td>
</tr>
<tr>
<td></td>
<td>Identify EDBs in their life</td>
</tr>
<tr>
<td></td>
<td>Plan counter behaviors to EDBs</td>
</tr>
<tr>
<td>Knowing others’ emotions</td>
<td>Interpret other’s emotions with awareness to own bias</td>
</tr>
<tr>
<td>Managing other’s emotions</td>
<td>Identify the most adaptive and effective reaction for changing another person’s emotions</td>
</tr>
<tr>
<td></td>
<td>Describe the value of positively changing another person’s emotions</td>
</tr>
<tr>
<td>Empathy</td>
<td>Demonstrate empathetic responses</td>
</tr>
<tr>
<td></td>
<td>Demonstrate motivation to practice empathy</td>
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</tbody>
</table>

Table 1. Summary of content of the Emotional Intelligence Training (EI) Training Program.

Figure 1. General 3-tiered structural organization of the EI training program.
A core element of the program will be the Emotion Tracker (ET). The ET will act as a type of self-monitoring simulator, similar to commercially available fitness trackers (e.g., Fitbit®). The ET will be learned early in Tier 1 and the student will have the opportunity to engage with the ET regularly throughout the program to monitor their thoughts, feelings, and behavioral reactions to various situations and stimuli. This component is still under development but will provide the user with a graphical interface that summarizes their current state and progress in emotional intelligence development.

Another key component of the training program is the use of the Reaction Cycle, shown in Figure 2. The reaction cycle is a reoccurring theme throughout the training program. It is a tool that illustrates the steps that occur before one chooses a behavior in response to a situation. The general concept is that emotions involve a cycle that begins with a situational context, an interpretation of the situation or event, a consequent emotion, including bodily reactions, action tendencies, and focus of attention, and is followed by a behavioral response/reaction. This cycle is presented frequently as a learning tool throughout the program and will provide a scaffolding to help the student understand emotional processes better. Various situations and practice items will require the learner to apply the reaction cycle concept to current emotional experiences. This repeated practice of interpreting emotional situations through the concept of the reaction cycle will aid students in recognize the factors that contribute to their emotional experiences, what their emotions mean, and the consequences of such emotions on their behavior.

Another feature of the current program development is the Bodily Reaction Tool. This is an activity that helps learners to understand that experiencing an emotion can induce differing intensities of sensations in different parts of the body. Learners are asked where they feel different sensations in their body when they experience joy, anger, and sadness. The tool is still under development and refinement, but is based on existing literature that shows how and were in the body that emotions are generally felt. The tool will allow the learner to click on regions where a particular emotion is felt and to indicate increased or decreased sensation in that region. We are actively working with our graphic designers to create a more accurate depiction of how we experience emotions throughout our bodies. Figure 3 shows the evidence based body map figure and a preliminary beta version of the tool that is being developed for implementation in the program.
The program will have many additional tools and interactive activities throughout. While not exhaustive, further examples of tools we are currently working on include behavior and interpretation mind maps (see Figure 4), and an emotion assessment grid (see Figure 5). The Behavior Mind Map is an activity that helps learners to see that there are many different ways to react to a situation. In the activity, learners are given a situation, and their objective is to come up with at least three different ways to react to that situation. The Interpretation Mind Map is an activity that helps learners to see that your initial interpretation may not always be the most helpful or “best” way to think about a situation. In the activity, learners are given a situation, and their objective is to come up with at least three different interpretations for the given situation.

As shown in Figure 6, the training program will track each learner’s awareness levels, how they felt completing different activities in and out of context, what activities are most effective for them based on their individual results, as well as different types of healthy coping mechanisms. Figure 6 provides a prototype example of a final overview screen that provides the individual
with a personalized description of their performance during the training, with suggested areas of strength and areas for continued improvement.

Over the past two quarters, our team has worked closely with the computer programmer/website developer to translate these concepts into workable platforms. We have closely copy-edited each of the lessons and have worked with a certified doctoral level Speech-Language Pathologist to level the reading grade level of all content to be readable by 8th grade readers. The content has also been closely edited by a doctoral level psychologist with expertise in emotional functioning and emotional intelligence. We also continue to work with the programmer/website developer to ensure that the general look and feel of the product will be attractive to military audiences.

We anticipate that the final beta-version of the program will be programmed and available from the website developer by August, 2017. At that time, we plan to conduct several iterative refinements to ensure the program is in full working order before moving to Task 3.
Recruitment: Recruitment for developmental testing has been dependent upon availability of product modules for testing. Technical issues have dictated some deviations in the initially anticipated development testing schedule, but we are progressing forward. As shown in Figure 7 below, recruitment efforts over the past year have been vigorous and extensive. As of this report, we have conducted 217 telephone interviews to screen potentially interested volunteers. As shown below, over 65% of interested volunteers have been deemed eligible and have either
completed an iteration (n=40), or are waiting to go through a new iteration of Task 2 (n=101). All 40 of the participants that completed the study had a 100% attrition rate, and have had no difficulties following the study visit.

A little less than 35% of interested volunteers were deemed ineligible. As depicted in Figure 8 below, of the 70 ineligible volunteers, the primary exclusionary criterion is the age limit of 18-35 years. Other screening criteria that lead to immediate exclusion have included a form of hearing loss, colorblindness, did not have English as their primary language, and/or were below an 8th grade reading level.

**Figure 8. Sample ineligibility.**

**Advertising/Recruitment Success:** In an attempt to better understand the effectiveness of our advertising efforts, we have conducted an extensive analysis of the source of recruitment and whether these sources yielded success in recruitment of participants. To accomplish this task, we asked each individual who contacted us for a telephone screening interview to indicate where they heard about our study. Figure 9 A and B below show the breakdown of data for the number of interested callers who found out about the study from each outlet. However, even though we receive a lot of calls from a particular advertising source does not mean that those calls will translate into actual enrolled participants. Therefore, we present data on the number of “eligible” participants that have resulted from each advertising venue.

As evidenced in the **Total Recruitment Source Response** figure below, many of our callers found out about our study from the local free Tucson Weekly newspaper, with 47 of our callers from that source. However, of those 47 callers, only 4% were eligible (n=6). This may be due to the fact that the Tucson Weekly is more likely to be read by those ages 35 and older. To alleviate this issue, we plan to advertise more frequently through sources that cater to a younger demographic that already yield successful enrollment rates, such as through Facebook and university listservs.
A) **Total Recruitment Source Response**

![Pie chart showing recruitment sources]

- Tucson Weekly: 6%
- Flyer on Campus: 22%
- Listerv: 21%
- Facebook: 25%
- Daily Wildcat: 1%

B) **Eligible Recruits from Each Source**

![Pie chart showing eligible recruits from each source]

- Tucson Weekly: 31%
- Flyer on Campus: 4%
- Listerv: 27%
- Facebook: 26%
- Daily Wildcat: 4%
- Friend: 6%
- Unspecified: 2%

Figure 9. Total recruitment by source (A) and eligible recruits from each source (B).

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

Two postdoctoral fellows, Dr. Alkozei and Dr. Smith, attended the Society for Biological Psychiatry Conference in Atlanta, GA in MAY 2016.

The PI, Study Coordinator, Graduate Student, and a Postdoctoral Fellow attended the Meeting for Associated Professional Sleep Societies in JUN 2016.

One postdoctoral fellow, Dr. Alkozei, attended the International Neuropsychological Society Meeting held in New Orleans, LA in FEB 2017.
How were the results disseminated to communities of interest?

We have worked to disseminate knowledge about Emotional Intelligence to a number of interested communities:

- We have given a presentation on emotional intelligence and the developing EIT program to groups of visiting Army Intelligence Officers from the Captain’s Career Course at Fort Huachuca on two separate occasions.
  - 08 NOV 2016
  - 19 APR 2017

- We gave presentations to retired Service members visiting the Kino Workforce Veteran’s Center in an effort to connect unemployed veterans with income earning opportunities.
  - JAN 2017
  - MAR 2017

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

We will utilize each data collection iteration of the refinement phase to inform us of the weaknesses and strengths of the program. We will do this by further bolstering recruitment efforts, enrolling and collecting data from those individuals whom are eligible to participate in the study.

Once the iterative refinement phase of the study is complete, we plan to begin collecting data for the Efficacy Phase of the study (Task 3) to determine the most effective training duration.

4. IMPACT:

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

Nothing to report.

What was the impact on other disciplines?

Nothing to report.

What was the impact on technology transfer?

Nothing to report.
What was the impact on society beyond science and technology?

Nothing to report.

5. CHANGES/PROBLEMS:

Changes in approach and reasons for change

Overall, the website developer/programmer has been taking slightly longer than initially planned to construct and deliver the program content. Throughout Year 1, we slowly realized that our initial anticipated plan of iterative refinement would be delayed due to the methodology of the programmers and web developers. It is critical that we have a solid working program before moving to the next phase of the study, so we have allowed the programmers some flexibility in completion time to ensure the highest quality content and presentation format. Due to the tiered nature of the new EI program, it became clear that our initial plan of iterative refinement of specific modules throughout Year 1 was unrealistic, as each module is built off of previous modules. Therefore, our plan is to conduct several iterative refinements of the program as a whole once we have a full working beta version. We received a rough beta version of one portion of the program on 14 APR 2017 and are working with our developers daily to fine tune it and fix technical issues before it is administered to participants.

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

Due to the aforementioned change in approach to the iterative refinement phase, recruitment and enrollment of participants has been slightly delayed. To remediate any issues the delay would otherwise pose, we have pre-recruited and screened 101 eligible individuals who are awaiting possible entry into the study. These individuals are waiting to be scheduled once the program is sufficiently functional and available for use.

Changes that had a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

- Significant changes in use or care of human subjects
  
  Nothing to report.

- Significant changes in use or care of vertebrate animals.
Nothing to report. (No use of vertebrate animals is required for completing the project)

- **Significant changes in use of biohazards and/or select agents**
  Nothing to report. (No use of biohazards and/or select agents is required for completing the project)

6. **PRODUCTS**: List any products resulting from the project during the reporting period. If there is nothing to report under a particular item, state “Nothing to Report.”

- **Publications, conference papers, and presentations**
  
  o **Journal publications**.
  
  Nothing to report.

  o **Books or other non-periodical, one-time publications**.
  
  Nothing to report.

  o **Other publications, conference papers, and presentations**.
  
  Nothing to report.

  o **Website(s) or other Internet site(s)**
  
  Nothing to report.

  o **Technologies or techniques**
  
  Nothing to report.

  o **Inventions, patent applications, and/or licenses**
  
  Nothing to report.

  o **Other Products**
7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Name: William D. “Scott” Killgore, Ph.D.
Project Role: PI
Nearest person month worked: 4
Contribution to Project: Dr. Killgore oversees all aspects of project progress and orchestrates data analysis and publication efforts.
Funding Support:
- W81XWH-12-1-0386
- W81XWH-14-1-0570
- W81XWH-14-1-0571

Name: John Allen, Ph.D.
Project Role: Co-PI
Nearest person month worked: 1
Contribution to Project: Dr. Allen assists in program module development.
Funding Support: no change

Name: Richard Lane, M.D., Ph.D.
Project Role: Co-PI
Nearest person month worked: 1
Contribution to Project: Dr. Lane assists in program module development.
Funding Support: no change

Name: Karen Weihs, M.D.
Project Role: Co-PI
Nearest person month worked: 1
Contribution to Project: Dr. Weihs assists in program module development.
Funding Support: no change

Name: Sahil Bajaj, Ph.D.
Project Role: Postdoctoral Fellow
Nearest person month worked: 2
Contribution to Project: Dr. Bajaj assists in program module development and performs data analysis and processing for the project.
Funding Support:
- W81XWH-12-1-0386
- W81XWH-14-1-0570
- W81XWH-14-1-0571

Name: Sara Knight
Project Role: Lab Manager
Nearest person month worked: 2
Contribution to Project: Ms. Knight oversees the administrative needs of the study and study staff, in addition to providing regulatory support and performing periodic quality control checks.
Funding Support: W81XWH-12-1-0386
W81XWH-14-1-0570
W81XWH-14-1-0571

Name: Sarah Berryhill
Project Role: Study Coordinator
Nearest person month worked: 6
Contribution to Project: Mrs. Berryhill oversees project progress and manages the day-to-day needs of the project.
Funding Support: W81XWH-12-1-0386
W81XWH-14-1-0570
W81XWH-14-1-0571

Name: Matthew Allbright
Project Role: Research Technician
Nearest person month worked: 1
Contribution to Project: Mr. Allbright oversees the technical aspects of the project and assists in database export, storage, backup, and management.
Funding Support: W81XWH-12-1-0386
W81XWH-14-1-0570
W81XWH-14-1-0571

Name: Skye Challener
Project Role: Research Technician
Nearest person month worked: 2
Contribution to Project: Ms. Challener provides support with data collection and recruitment activities.
Funding Support: W81XWH-12-1-0386
W81XWH-14-1-0570
W81XWH-14-1-0571

Name: Alyssa Dormer
Project Role: Research Technician
Nearest person month worked: 2
Contribution to Project: Ms. Dormer provided support with data collection and recruitment activities.
Funding Support: W81XWH-12-1-0386
W81XWH-14-1-0570
W81XWH-14-1-0571
Name: Melissa Kelly Gottschlich  
Project Role: Research Technician  
Nearest person month worked: 2  
Contribution to Project: Ms. Gottschlich provides support with data collection and recruitment activities.  
Funding Support: W81XWH-12-1-0386  
W81XWH-14-1-0570  
W81XWH-14-1-0571

Name: Simone Hyman  
Project Role: Research Technician  
Nearest person month worked: 3  
Contribution to Project: Ms. Hyman provides support with data collection and recruitment activities.  
Funding Support: W81XWH-12-1-0386  
W81XWH-14-1-0570  
W81XWH-14-1-0571

Name: Jacqueline Marquez  
Project Role: Research Technician  
Nearest person month worked: 4  
Contribution to Project: Ms. Marquez provides support with data collection and recruitment activities.  
Funding Support: W81XWH-12-1-0386  
W81XWH-14-1-0570  
W81XWH-14-1-0571

Name: Anna Sanova  
Project Role: Research Technician  
Nearest person month worked: 3  
Contribution to Project: Ms. Sanova provides support with data collection and recruitment activities.  
Funding Support: W81XWH-12-1-0386  
W81XWH-14-1-0570  
W81XWH-14-1-0571

Name: Anmol Singh  
Project Role: Research Technician  
Nearest person month worked: 3  
Contribution to Project: Mr. Singh provides support with data collection and recruitment activities.  
Funding Support: W81XWH-12-1-0386  
W81XWH-14-1-0570  
W81XWH-14-1-0571
Name: John R Vanuk  
Project Role: Graduate Student  
Nearest person month worked: 5  
Contribution to Project: Mr. Vanuk provides support with data collection, recruitment activities, and performs data analysis and processing for the project.  
Funding Support: no change

**Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?**

Name: William D. “Scott” Killgore, Ph.D.  
Project Role: PI  
Changes in funding support:  
- Closure of DoD sponsored project W81XWH-11-1-005: 31 DEC 2016

**What other organizations were involved as partners?**

Smart Sparrow, LLC  
375 Alabama St., Suite 490  
San Francisco, CA 94110  
- Software developers hired to engineer and program the Emotional Intelligence Training Program.

8. SPECIAL REPORTING REQUIREMENTS

**COLLABORATIVE AWARDS:** For collaborative awards, independent reports are required from BOTH the Initiating PI and the Collaborating/Partnering PI. A duplicative report is acceptable; however, tasks shall be clearly marked with the responsible PI and research site. A report shall be submitted to [https://ers.amedd.army.mil](https://ers.amedd.army.mil) for each unique award.

*n/a—not a collaborative award*

**QUAD CHARTS:** If applicable, the Quad Chart (available on [https://www.usamraa.army.mil](https://www.usamraa.army.mil)) should be updated and submitted with attachments.

*Please find an updated quad chart in the appendices*
9. APPENDICES:

TABLE OF CONTENTS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. List of Assessments</td>
<td>22</td>
</tr>
<tr>
<td>2. Assessments</td>
<td>23</td>
</tr>
<tr>
<td>3. Quad Chart</td>
<td>64</td>
</tr>
<tr>
<td>4. William D. “Scott” Killgore, Ph.D. Curriculum Vitae</td>
<td>65</td>
</tr>
</tbody>
</table>
Refinement and Validation of a Military Emotional Intelligence Training Program

List of Assessments and Computer-Administered Tasks

Demographics Questionnaire

Mindful Attention Awareness Scale - Trait (MAAS-Trait)

Mindful Attention Awareness Scale – State (MAAS-State)

Multidimensional Assessment of Interoceptive Awareness (MAIA)

Emotional Intelligence Training Program – (Iterations 1-4)
Demographics Questionnaire

Please complete the survey below.

Thank you!

Date: __________________________________

Date of Birth: __________________________________

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

Please Specify: ____________________________________

Did you consume any products containing caffeine today?  ☐ Yes  ☐ No

What kind of product did you consume and at what time today?

__________________________________________

How much of the product containing caffeine did you consume? (e.g. 1 cup coffee)

__________________________________________

Are you taking any medications?  ☐ Yes  ☐ No

What kind of medication are you taking and how much?

(e.g. Lexapro, 10 mg )
Maas State

1. When I am tense I notice where the tension is located in my body.

Using the 0-6 scale shown, please indicate to what degree you were having each experience described below when you were going through the awareness training program. Please answer according to what really reflected your experience rather than what you think your experience should have been.

<table>
<thead>
<tr>
<th></th>
<th>(0) Not at all</th>
<th>(1)</th>
<th>(2)</th>
<th>(3) Somewhat</th>
<th>(4)</th>
<th>(5)</th>
<th>(6) Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I was finding it difficult to stay focused on what was happening.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>2. I was doing something without paying attention.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>3. I was preoccupied with the future or the past.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>4. I was doing something automatically, without being aware of what I was doing.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>5. I was rushing through something without being really attentive to it.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
MAAS Trait

1. When I am tense I notice where the tension is located in my body.

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

<table>
<thead>
<tr>
<th>Statement</th>
<th>(1) Almost Always</th>
<th>(2) Very Frequently</th>
<th>(3) Somewhat Frequently</th>
<th>(4) Somewhat Infrequently</th>
<th>(5) Very Infrequently</th>
<th>(6) Almost Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>I could be experiencing some emotion and not be conscious of it until some time later.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I break or spill things because of carelessness, not paying attention, or thinking of something else.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I find it difficult to stay focused on what's happening in the present.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I tend not to notice feelings of physical tension or discomfort until they really grab my attention.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I forget a person's name almost as soon as I've been told it for the first time.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It seems I am &quot;running on automatic,&quot; without much awareness of what I'm doing.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I rush through activities without being really attentive to them.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>S. No.</td>
<td>Statement</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>I do jobs or tasks automatically, without being aware of what I'm doing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I find myself listening to someone with one ear, doing something else at the same time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I drive places on &quot;automatic pilot&quot; and then wonder why I went there.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I find myself preoccupied with the future or the past.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I find myself doing things without paying attention.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I snack without being aware that I'm eating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Multidimensional Assessment of Interoceptive Awareness (MAIA)

Contact: Wolf E. Mehling, MD
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San Francisco, CA 94115
Phone: 01 (415) 353 9506
mehlingw@ocim.ucsf.edu
http://www.osher.ucsf.edu/maia/
Below you will find a list of statements. Please indicate how often each statement applies to you generally in daily life.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Circle one number on each line</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I am tense I notice where the tension is located in my body.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>2. I notice when I am uncomfortable in my body.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>3. I notice where in my body I am comfortable.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>4. I notice changes in my breathing, such as whether it slows down or speeds up.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>5. I do not notice (I ignore) physical tension or discomfort until they become more severe.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>6. I distract myself from sensations of discomfort.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>7. When I feel pain or discomfort, I try to power through it.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>8. When I feel physical pain, I become upset.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>9. I start to worry that something is wrong if I feel any discomfort.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>10. I can notice an unpleasant body sensation without worrying about it.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>11. I can pay attention to my breath without being distracted by things happening around me.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>12. I can maintain awareness of my inner bodily sensations even when there is a lot going on around me.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>13. When I am in conversation with someone, I can pay attention to my posture.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>14. I can return awareness to my body if I am distracted.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>15. I can refocus my attention from thinking to sensing my body.</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>16. I can maintain awareness of my whole body even when a part of me is in pain or discomfort.</td>
<td>0 1 2 3 4 5</td>
</tr>
</tbody>
</table>
Please indicate how often each statement applies to you generally in daily life.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. I am able to consciously focus on my body as a whole.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. I notice how my body changes when I am angry.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. When something is wrong in my life I can feel it in my body.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. I notice that my body feels different after a peaceful experience.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21. I notice that my breathing becomes free and easy when I feel comfortable.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22. I notice how my body changes when I feel happy / joyful.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23. When I feel overwhelmed I can find a calm place inside.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>24. When I bring awareness to my body I feel a sense of calm.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>25. I can use my breath to reduce tension.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>26. When I am caught up in thoughts, I can calm my mind by focusing on my body/breathing.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>27. I listen for information from my body about my emotional state.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>28. When I am upset, I take time to explore how my body feels.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>29. I listen to my body to inform me about what to do.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>30. I am at home in my body.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>31. I feel my body is a safe place.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>32. I trust my body sensations.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Subject: Identifying the most effective frequency of meditative practice within a learning session using mindfulness as the focus area.

This series of tests will consist of four experimental groups of approximately 10 participants each. The process will consist of a demographics questionnaire and initial assessment comprised of multidimensional assessment of interoceptive awareness (MAIA), followed by the participation in the learning experience, and concluding with a post-assessment of the MAIA. The four experimental groups each receive the same learning experience with variable frequency of mindfulness meditation practice. The learning experience in this test teaches mindfulness and is composed of three submodules: High level mindfulness, focus on the present awareness aspect of mindfulness, focus on the nonjudgmental aspect of mindfulness. Group 1 will have 1 mindfulness practice, Group 2 will have two different practices, Group 3 will have 3 different practices, and Group 4 will have 3 identical practices. The results of this test will inform design of the overall learning experience moving forward.

Series 1 Test

Group 3
What is your level of experience with mindfulness or meditation?

- None
- Heard about it, not sure what it is
- I know what it is but have never practiced it
- I have tried mindfulness meditation but didn’t like it
- I have done it a few times but don’t do it often
- I practice mindfulness meditation often

What is your comfort level with mindfulness and meditation?

- I feel confident and ready to meditate on my own
- I may be able to meditate on my own, but I probably need more guidance
- I need more guidance before I am able to meditate on my own
- I am not comfortable meditating, even with guidance

Next
How motivated do you feel to practice mindfulness or meditation?

- I'm very motivated to practice them
- I'm looking forward to learning and practicing them
- I'll give it a try, but I am not sure about this
- I don't want to practice mindfulness and meditation

What ideas and emotions do you have about mindfulness and meditation?

- Calming
- Easy
- New-agey
- Trendy
- Useful
- Important
- Lame
- Funky
- Stress relieving
- Useless

If you were asked about mindfulness, how would you describe it?

If you were asked about mindfulness, how would you describe it?
Mindfulness

This word has popped up more and more lately. It's been on the covers of magazines, in the mouths of celebrities, and in the titles of books. But what does mindfulness really mean?

What does mindfulness mean to you?

Drag the items that best describe mindfulness from the bank on the right into the area on the left. Be sure to scroll down to see all the items in the item bank.

Remaining Calm

Mindful Eating
Introducing Mindfulness

WHY MINDFULNESS IS A SUPERSWER
NARRATED BY JAIN HARRIS
ANIMATION BY KATY DAVIS

Let’s start off trying to be mindful with a short breathing exercise. While doing this, try staying attentive to your breath, the sensation of the air going through your body, and the movements associated with breathing. Every time you notice your mind wandering away from these things, gently return your attention to your breathing.

We will be using a four-count breathing pattern. First, inhale deeply from your belly for a count of four. Then hold your breath for a count of four and exhale for a count of four to empty all the air from your lungs and finish by holding your empty lungs for four seconds. Repeat this cycle four times.

Give it a try and press next when you’re finished.

1... 2... 3... 4...
Mindfulness is new to a lot of people so take a minute to think about how this experience went.

How comfortable was the exercise for you?
- Buriedly empty
- Mind, but fine
- Pretty uncomfortable

How difficult was it for you to keep your attention on your breathing?
- Super easy
- Kinda easy
- Tough
- Really hard

When you felt your mind wander, were you able to bring your attention back to your breathing?
- Absolutely
- Most of the time
- Sometimes
- Never

Were you feeling like you might be doing this wrong?
- Yes
- A little bit
- No

Next

The main components of mindfulness (click on the bold text to read more)

Mindfulness is:
"Paying attention on purpose, in the present moment, and non-judgmentally."

Mindfulness is the conscious and deliberate direction of our attention. When we are going through the day our attention is often swept up by a never-ending current of thoughts but when we are mindful we "wake up" and step out of that current, placing attention where we choose.

We’re very rarely fully present in the moment. We get caught up in replaying the past and imagining the future. Mindful attention, however, is completely engaged in the present moment experience — the here and now.

When practicing mindfulness we’re not trying to control, suppress, or stop our thoughts. We aim to pay attention to our experience as they arise without judging or labelling them in any way.

Next
Mindfulness Myths - Calm, happy, and relaxed

<table>
<thead>
<tr>
<th>Remaining Calm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxation</td>
</tr>
<tr>
<td>Maintaining</td>
</tr>
<tr>
<td>Happiness</td>
</tr>
<tr>
<td>Stress Reduction</td>
</tr>
</tbody>
</table>

Remaining calm, relaxed and happy is not necessarily a part of mindfulness practice. In fact, sometimes practicing mindfulness can be a bit stressful. It doesn’t come easy of first and can make you deal with some uncomfortable emotions. However, mindfulness does help us observe emotions as they arise without getting caught up in them and being swept away in their current resulting in less distress and more happiness and relaxation overtime.

Mindfulness Myths - Meditation

It’s true that mindfulness meditation is a good way to practice and improve your mindfulness skills, but it can be done as part of your daily routine. Even when mindfulness is practiced through meditation does not require a specific pose or 40 days of silence in the desert. It’s just about purposely focusing your attention on something immediate and not judging it.
Mindfulness - Exercise the Brain

Mindfulness is in fact a cognitive ability that can be practiced and improved. It can be looked at as an exercise for the brain muscle. The more you practice mindfulness, the stronger the muscle gets.

Zoning out

One type of non-mindful behavior is sometimes referred to as being on “autopilot.” Have you ever been reading a book and reached the bottom of the page, then not even remembering what you just read? Or been in the shower not sure if you already washed your hair? Or maybe been driving to the store and find yourself suddenly in the parking lot without noticing that you drove all the way there? This is very common behavior that happens to almost everyone.

When do you find yourself on “autopilot”?

- Brushing your teeth
- Taking a shower
- Driving
- Waking my dog
- Watching TV
- Other
In the Zone

Being present allows one to evaluate the best way to react in the present moment. Imagine skiing downhill at high speed. You feel the wind whipping past you, the cool mountain breeze, and enjoy the deep blue of the sky. You’re in the zone. You’re in the moment and experiencing every piece of it. When you’re in the zone, you stop being trapped in “doing” and start just “being” in the present moment.

What’s something in your life that would benefit from being present or in the zone?

### Recognizing mindfulness behaviors

Sort the following behaviors into whether they are being practiced mindfully:

- Listen to an audiobook while lying down
- Take a run and focus on your muscles
- Savor the taste of your burger
- Feel stupid for being sad that the Panthers lost the Super Bowl
- Mindful
- Not Mindful
Why should we practice mindfulness? Click the articles to read a little more!

Mindfulness Meditation Could Lower Levels Of Cortisol, The Stress Hormone

Mindfulness holds promise for treating depression
New research suggests that practicing mindfulness may help prevent a relapse.

Mindfulness meditation improves cognition: Evidence of brief mental training.

Furlan, Stefan1**, Susan K. Johnson1**, Bruce J. Schacter1**, Rhonda David1, Paula E. Erel1**

Testimonials

If you just sit and observe, you will see how restless your mind is. If you try to calm it, it only makes things worse, but over time it does calm, and when it does, there’s room to hear more subtle things — that’s when your intuition starts to blossom and you start to see things more clearly and be in the present more.

Meditation really helps create not only a sense of balance... but serenity and kind of a calm state of mind... it helps me deal with ups and downs, coming from more of a centered place. Also it helps with creativity... it’s tapping into something so deep that when I lose the rewards, I do not even know I’m reaping them.

Steve Jobs

In moments of madness, meditation has helped me find moments of serenity... and I would like to think that it would help provide young people a quiet haven in a noisy world... it’s a healing gift, something you can call on at any time... I think it’s a great thing.

Paul McCartney

Next
You’ve now heard quite a bit about how mindfulness has affected other people. Try thinking about how you could benefit from it.

Below is a list of positive outcomes of mindfulness practice. Drag the ones that you’d most like to see in your life into the area on the left:

- Boosted working memory
- Improved Focus
- Increased relationship satisfaction
- More cognitive flexibility
- Increased Body Satisfaction
- Reduced Distractions
- Reduced stress and anxiety
- More comfortable with

After all this, you definitely want to improve your mindfulness, right? You’re probably wondering how you can do that. One great way to practice is through meditation. Mindfulness meditation is very flexible and doesn’t require much time or specific conditions. On the next screen you’ll watch a video about the basics of mindfulness meditation.
Meditation 101

Based on the video, which of these are the true of mindfulness meditation?

- Losing your focus while meditating means you are doing it wrong.
  - True  $\checkmark$

- In order to start meditating, you need to find a silent place and lay down.
  - True $\checkmark$

- Maintaining mindfulness meditation practice over time is important even for just a few minutes a week.
  - True $\checkmark$

- Meditation is hard and failing is a part of the process.
  - True $\checkmark$

- The most important part of mindfulness meditation is continually returning your focus to the present moment nonjudgmentally.
  - True $\checkmark$

Next
This information on meditation could be new to you or you could already have known all this. How are you feeling about meditation right now?

- I am ready to do it.
- Sounds interesting, but I'd like to hear more.
- Sounds nice, but probably not my thing.
- This is not something that interests me.
- I still don't understand what this is or why I should do it.

Your First Mindfulness Meditation Practice

By this point, you should have started to understand the components of mindfulness and the benefits of practicing mindful meditation. On the next screen, you'll go through a short, guided mindfulness meditation practice.

During this quick practice, keep the components of mindfulness in your head to help you get the most out of this experience.

- Present-focused
- Nonjudgmental
- Intentional
Your First Mindfulness Meditation Practice

Alright! So now you’ve tried mindfulness meditation. What did you think?

- It was weird
- I liked it
- This was stupid
- I wouldn’t do myself doing this
- I liked it but I can’t imagine making it part of my day
- It was boring
- It was hard
- None of these

After giving mindfulness a try, what did you notice you were feeling?

- I felt my body and mind relax a little bit
- I felt calmed and a sense of tranquility
- I felt like falling asleep
- I felt embarrassed and self-conscious
- I felt great about trying something new
- I didn’t feel any of these things
Mindfulness

Now that you’ve got a good understanding of how mindful meditation is practiced, let’s look a little deeper at the components of mindfulness. Pick which one you’d like to explore first.

Present-focused

Non-judgmental

Intentional

Mindfulness is a practice that can only be effective if you make a choice to do it. The intentional component of mindfulness is in making time in your day to take five minutes and practice. This may seem simple, but life is busy and there’s a lot of things that can get in the way.

If you were to decide right now to practice mindfulness in your day, what do you think would get in the way most?

- I wouldn’t be interested in doing it
- I’d have trouble finding time
- I couldn’t keep going if I didn’t make progress quickly
- I have trouble being motivated
- I don’t think I’d benefit from it
- I wouldn’t be anything stops me

Next
One component of mindfulness is maintaining focus on the present. Take a look at this picture.

By maintaining focus on the present, we can make sure that we fully experience what’s going on around and within us. How well were you aware of what was in that picture?

How many feathers?
- 0
- 1
- 2
- 3

What color was the thumbtack?
- Blue
- Green
- Red
- There was no thumbtack

Which of the following was in the image? (Select all that you saw):
- Blue feather
- Spider
- Rattlesnake tail
- Arrowhead
- Feather

Which of these did you see? (Select all that you saw):
- Penny
- Paperclip
- Green pin
- Ruler
- Pencil
Maintaining focus on the present isn’t always easy. There are a lot of distractions in our lives. While you were looking at that picture, what were you thinking about?

What were you feeling while completing this exercise?

- I was getting distracted by my surroundings
- I got wrapped up in my thoughts
- I was feeling nervous to get the question correct
- I don’t understand why I am doing this
- I enjoyed looking at the details of the picture
- I just wanted to get this over with
- I was overwhelmed by the amount of detail
- Nothing

So much of our time is spent thinking about what we’ve done in the past or what might be coming right around the corner—and with good reason! Learning from past experiences shapes a lot of our behaviors and planning for the future helps make us feel more secure in the present. However, something that neither of these things can do is help us understand what’s going on with us right now. We can’t see everything in this picture if our minds are busy with the past or future...
When we experience an emotional reaction, we usually do one of two things and some of us do both (click on each to see an example):

- Connect emotions to memories

- Catastrophize the future

If we remember feeling annoyed the last time that we waited in line at the post office, it's possible that focusing on that negative experience can make us start to feel frustrated even when the situation doesn't cause it. No two experiences are the same. Just because something's happened in the past, doesn't mean it's guaranteed to happen again right now.

If we're sad about a break-up and begin to think that we're going to be single forever that can be even more depressing! It's easy to start to predict the future when we're experiencing a negative emotion, but there's nothing that's 100% certain about the future.

Let's say you are going to a party and don't know anybody who's going to be there. You are a bit stressed about talking to new people and might even have had some awkward experiences in the past. What would be a mindful response in this situation?

- Think about the things that you feel you did wrong last time and how you're not going to keep that from happening this time.
- Worry about no one wanting to talk to you.
- Start talking to someone, listen, and direct your attention to what they are saying.
- Plan questions and topics to talk about with new people.
Losing focus on the present moment is something that happens to people a lot and not only when they’re having an emotional reaction. We also tend to lose focus on the present when we’ve got a lot of different things to do or are thinking about unrelated ideas. Common wisdom is that doing more than one thing at a time will save you time and effort.

What do you think?

- Multitasking is better
- It’s easier to focus on one thing at a time
- Multitasking can be hard, but works really well if you do it right
- That’s not really a difference
- I haven’t even really thought about it

---

Hi,

I read the report you sent yesterday about employee satisfaction across the company and I am finding it difficult to understand what justifies the change from the data you sent last Monday. It seems that the percentage of non-technical employees should not have gone up. Is that a mistake? In addition, the overall employee satisfaction score seems a bit low. Does this include management? How many employees took the questionnaire?

I suggest re-sending a form via email to all of the employees and changing the wording of the questions to be more positive. Please make sure to send the new form to me by Tuesday for approval. I’ll get it back to you by the next day and you can send it out immediately. I assume three days would be enough to collect all the forms and finalize the numbers right?

Thank you for the good work.

---

Next
Frequency of Practice: Group 3

Let's see how much you were able to focus on either of these conversations.

When is your boss expecting to get the revised form?
- Monday
- Tuesday
- Thursday
- No deadlines

When does she expect you to change in the form?
- Improve the quality
- Give it to management
- Make the language more polite
- Give it to more tech people

When is she expecting the final number?
- Tuesday
- Wednesday
- Thursday
- Friday
- Monday

What does your friend hate to be called?
- Kid
- Girl
- Vic
- Vicky

Where is your friend from?
- New Zealand
- England
- Australia
- Unknown

Next

Multitasking can seem efficient, but is it really? Take a minute to think about how you feel trying to do two things at once.

What was your mind doing while you were trying to multitask?
- Trying to focus on just one thing
- Struggling to pay attention to either one
- Tried to switch back and forth, but was always thinking about the other one
- I completely shut down. It was too much
- I did my best to pay attention to both, but couldn't
- I had no problem doing both

Next
Anchoring ourselves in the present is very effective in mindfulness, but not easy to do. Like everything in mindfulness, it will take a lot of practice. Start now by taking a moment to simply notice something that’s going on right now. This can be something happening around you or something going on inside you.

What did you notice?

Remember this is something that nobody does perfectly the first time. On a scale of 1 to 10, how well do you think you were able to anchor yourself in the present moment just now when you took the time to notice something?
You can practise this quickly everyday using a simple form like the one below. Take a few moments everyday for at least a week to notice one thing that is happening to you. This can be a sound you hear, something you see, feel, or even smell. The goal of this activity is not to think about the meaning of what you notice nor is it to try to understand your reaction to it.

When you take the time to fill out this form, take a deep breath and focus on what’s going on in the present.

<table>
<thead>
<tr>
<th>Day</th>
<th>What did you notice</th>
<th>How effective were you at anchoring yourself to the present? (Circle all that apply): 10 (barely)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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Being focussed on the present moment is important for determining whether our emotional responses are an accurate reflection of current situational demands and needs. In other words, does what we are feeling actually have to do with what is happening now?

In what situations can being focussed on the present help you in your life? (Select as many as you like)

- Focusing at work
- Trying to reach a personal goal
- Training at the gym
- Connecting with people
- Picking up a new hobby
- Learning about the world around you

Next
Frequency of Practice: Group 3

Nonjudgmental awareness

Mindfulness is all about focusing on what we’re experiencing—whether it be emotions, sensations, or actions. Whenever we feel something, it is often our first instinct to evaluate it and decide whether it was good or bad. We decide whether that’s how we should be feeling and, if we don’t like it, we try to change it.

In mindfulness, it is important to avoid making these kinds of judgments and to begin to see these experiences as passing states—not good or bad, but just happening.
Nonjudgmental awareness

In your life, which of these things do you tend to be judgmental about? (Select all that apply)

- Want things you said
- Times that you've done something you regret
- Being on Netflix
- Eating so much you feel sick
- Deciding not to exercise
- Avoiding your responsibilities
- Making questionable choices
- The way you react in certain situations
- If other not sure

Next

When we're constantly making judgments on our thoughts, feelings, and actions, that can cause even more severe reactions to them. For example, if you notice that you're lagging your foot and try to stop it, it suddenly becomes a lot harder to not tap your foot. You might even get anxious that you're not tapping it.

EMOTION → JUDGMENT → REACTION

Next
In mindfulness, this same principle applies. Instead of trying to stop from feeling sad or mad, we should just observe that that's how we're feeling and let that feeling exist. Then it can naturally ebb, as all emotions do, like ripples in a pond.

Staying in touch with our experience, even when they are uncomfortable, and accepting them as they are is what mindfulness is all about. This is not to say that we should never try to change our emotions or add-ons, but that we let them pass nonjudgmentally without struggling with them and take steps to make them better in the future if necessary.

Brainstorm a couple of ways to react to those experiences that are nonjudgmental.
Practice not judging your experiences

Pretend that you entered a race and trained hard for a month beforehand. Unfortunately, you weren’t able to place in the top of the finishers. For this reason, select the non-judgmental way to rephrase it.

- "I lost the race so I must be terrible at running. I shouldn’t have tried."
- "Losing a race is a stupid reason to feel bad."
- "I didn’t try my hardest; I could have done better."
- "I’m not going to feel bad about this race anymore."
- "I probably shouldn’t have even been in the race."
- "I’m not going to feel bad about this race anymore."

Being nonjudgmental is an important part of mindfulness, but it doesn’t come easily. Filling the form below after practicing mindfulness is one way to practice this skill. The goal of this exercise is to get used to paying attention to what is happening inside and around you and not judging it. Practice acknowledging thoughts and feelings as they are, let go of the need to critically judge, changes, or avoid the experience.

You could try tracking your progress at being nonjudgmental as you practice mindfulness using this form.

<table>
<thead>
<tr>
<th>Day</th>
<th>Thoughts</th>
<th>Physical Sensations/ Feelings</th>
<th>Behaviors</th>
<th>How/Perhaps nonjudicial non-judging practice?</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
</table>
In addition to not judging our emotions, sensations, and actions when practicing mindfulness, we should also try not to judge ourselves as either succeeding or failing at mindfulness. Just by doing it, we succeed at mindfulness.

Do you think that using a form like the one on the previous page would help you to be more mindful in your mindfulness practice?

- Yes
- No
- Don't know

Mindfulness Practice

Remember, the goal is to let go of judgment about your experience and to just practice being an observer of your own experience or reactions. In this sense, there is no "right" or "wrong" way to practice mindful meditation, just getting used to observing how your thoughts, feelings, sensations, and behaviors unfold and influence each other.

Let’s practice again, only this time see if you can just observe any negative thoughts that come up, noticing them as just thoughts, not allowing yourself to struggle with them, and noticing what physical sensations and behaviors also arise.
Mindfulness Practice

Mindfulness meditation doesn’t always have to be guided. For this first meditation, apply what you’ve learned in your previous meditations to meditating while listening to a piece of music.

While listening to this song, focus on the sounds and bring your attention back to the music when you get distracted. If any emotions arise, try to observe them as they are and don’t try to change them or influence them. Let the emotions ebb and flow naturally and notice how they affect your thinking.

Press next when you’re ready to get started! It might help to keep your eyes closed for this meditation, but only do what you’re comfortable with.
Mindfulness Practice

What is your comfort level with mindfulness and meditation?

- I feel confident and ready to meditate on my own.
- I may be able to meditate on my own, but I generally need more guidance.
- I need more guidance before I am able to meditate on my own.
- I am not comfortable meditating, even with guidance.

How motivated do you feel to practice mindfulness or meditation?

- I'm very motivated to practice.
- I'm looking forward to learning and practicing.
- I'll give it a try, but I am not sure about this.
- I don't want to practice mindfulness and meditation.

Finish

Next
What ideas and emotions do you have about mindfulness and meditation?

- Calming
- City
- New-agey
- Trendy
- Useful
- Important
- Lame
- Futty
- Stress reducing
- Gossipy

Next

If you were asked about it, how would you describe mindfulness?

How comfortable were you with the length of this lesson?

- It was difficult to sit for so long
- I was wanting to get a bit away
- I would have been a little shorter
- It was just right
- It should've been longer

Next
What are your thoughts about the time you spent practicing meditation in this lesson?

- Helpful
- Negative
- Annoying
- Not useful
- Fun
- Nice
- Fruitless

How enjoyable was the time you spent practicing meditation in this lesson?

- Awesome
- Okay
- Mild
- Annoying
- I'm just glad it's over

Did you feel more empowered to practice mindfulness with repeated practice?

- Yes
- No

Which of the mindfulness practices did you find most effective for you?

- Focused breathing
- Mindfulness meditation
- Mindfulness meditation with focus on negative emotions
- Mindfulness while listening to music
- None of these were particularly effective

Finish
Group 1 and 2

There are no additional screens. Some screens from Group 3 are not included in Group 1 and 2.
Mindfulness Practice

After learning about some of the components of mindfulness, let us now your second mindfulness practice guide! Please click to start your meditation.
Video URLs

Mindfulness Definition: https://youtu.be/w6T02g5hnT4

Meditation Onboarding: https://youtu.be/rqoxYKlEWEc

Guided Body Scan: https://youtu.be/ZM3eYRODNbc

Unguided Music Meditation: (audio only) https://www.youtube.com/watch?v=RXV0nU3zs6A
Refinement and Validation of a Military Emotional Intelligence Training Program

Opportunity: W81XWH-15-JWMRP

PI: William D. Killgore Ph.D.  
Org: University of Arizona  
Award Amount: $5,978K

Study Aims

1) Identify key training components (i.e., content, frequency, duration) that lead to the greatest improvement in measured skills across all EI domains
2) Identify the neural mechanisms underlying the observed changes in EI abilities
3) Determine the effectiveness of the EI training program for enhancing military performance and sustaining psychological health during stressful military operations/activities/deployments

Approach

We have demonstrated the effectiveness of a brief 6-lesson pilot version of a training program to enhance EI skills in military personnel. We plan to enhance the effectiveness of the program through iterative refinement, efficacy testing in healthy samples, neuroimaging of brain mechanisms, and ultimate validation in military samples. The goal is to develop a program that enhances emotional performance and mental health during military training and deployment.

Timeline and Cost

<table>
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<tr>
<th>Activities</th>
<th>CY</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
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<td>Study Preparation</td>
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<td>Task 1: Retooling</td>
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<td>Task 3: Efficacy</td>
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<td>Task 4: Neuroimaging</td>
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<td>Task 5: ROTC Effectiveness</td>
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<td>Task 6: Deployment Effectiveness</td>
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</table>

Estimated Total Budget ($K)*

<table>
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<tr>
<th>FY16</th>
<th>FY17</th>
<th>FY18</th>
<th>FY19</th>
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<tr>
<td>$1,384</td>
<td>$1,659</td>
<td>$1,601</td>
<td>$1,333</td>
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</table>

Goals/Milestones

**FY16 Goal** – Study Preparation, Refine EI Program
- Prepare materials; complete agreements for use; IRB approvals
- Complete redesign of basic pilot EI program (Task 1)
- Complete iterative refinement of program (n = 300) (Task 2)

**FY17 Goal** – Start Efficacy Trial & Neuroimaging; Start Military Trials
- Collect data on n = 231 healthy controls (Task 3)
- Collect Summer ROTC Field Course data (n = 40) (Task 5)
- Begin Pre-deployment Assessment & EI Training (Task 6)

**FY18 Goal** – Continue Data Collection
- Collect data on n = 231 healthy controls (40 neuroimaging) (Task 4)
- Collect Summer ROTC Field Course data (n = 40)

**FY19 Goal** – Complete Data Collection, Analysis, and Publication
- Complete Summer ROTC Field Course data (n = 40) (Task 5)
- Complete post-deployment assessments (Task 6)
- Analyze and Publish findings

**Budget Expenditure to date**
Projected Expenditure: $1,384K; Actual Expenditure: $611,956.66

*Includes Direct + Indirect Costs

Updated: 13 MAY 2017
Curriculum Vitae

DATE PREPARED: October 13, 2016

NAME: WILLIAM DALE (SCOTT) KILLGORE

OFFICE ADDRESS: 7303B
Department of Psychiatry
University of Arizona HSC
1501 North Campbell Ave.
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Tucson, AZ 85724 United States

HOME ADDRESS: 7256 E Camino Valle Verde
Tucson, AZ 85715 United States

WORK PHONE: (520) 621-0605

WORK EMAIL: Killgore@psychiatry.arizona.edu

WORK FAX: (520) 626-6050

PLACE AND DATE OF BIRTH
Anchorage Alaska, September 2, 1965

CITIZENSHIP USA

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

LICENSURE/CERTIFICATION

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 - 6/14  Associate Professor of Psychology in the Department of Psychiatry
Harvard Medical School, Boston, MA

7/14-           Associate Professor of Psychology in the Department of Psychiatry (part-time)
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—Non TE
University of Arizona College of Medicine, Tucson, AZ

9/14           Professor of Psychology—Non TE
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 Chief Psychologist, GovSource, Inc., U.S. Department of Defense (DoD) Contractor

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 -  Research Psychologist, McLean Hospital, Belmont, MA

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

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 - Lieutenant 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 Advance 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

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- McLean Hospital Research Committee, McLean Hospital, Belmont, MA

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
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
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

**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-  Member, Mentoring Committee, Department of Psychiatry, University of Arizona, Tucson, AZ
2016  Member, Dissertation Committee, Brian Arizmendi, Department of Psychology,
University of Arizona, Tucson, AZ
2016  Member, Masters Thesis Committee, Saren Seeley, Department of Psychology, University of Arizona, Tucson, AZ
2016  Member, Masters Thesis Committee, Mairead McConnell, Department of Psychology, University of Arizona, Tucson, AZ
2016  Faculty Advisor, Undergraduate Honor Thesis Committee, Matthew Nettles, Neuroscience/Cognitive Science, University of Arizona, Tucson, AZ

University Committees

2006  External Member, Doctoral Thesis Committee, Belinda J. Liddle, Ph.D., University of Sydney, Australia
2014  Ad Hoc Member, Interview Committee for Defense and Security Research Institute Director Position, University of Arizona, Tucson, AZ.
2014-  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  Imaging Excellence Cluster Hire Search Committee, University of Arizona, Tucson, AZ
2015-2016  Member, Neuroimaging Cluster Hire Faculty Search Committee, University of Arizona, Tucson, AZ

Editorial Board Membership

2009-  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

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
<table>
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<td>Reviewer, Journal of Abnormal Psychology</td>
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<td>Reviewer, European Journal of Child and Adolescent Psychiatry</td>
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<td>Reviewer, Brazilian Journal of Medical and Biological Research</td>
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<td>Reviewer, The Harvard Undergraduate Research Journal</td>
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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
2013-2016 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 Reviewer, Scientific Reports
2016 Reviewer, Neuroscience & Biobehavioral Reviews
2016 Reviewer, Psychological Science
2016 Reviewer, Medicine & Science in Sports and Exercise
2016 Reviewer, Archives of Clinical Neuropsychology

PUBLICATIONS/CREATIVE ACTIVITY

Refereed Journal Articles


75. Killgore, WD, & Yurgelun-Todd, DA. Cerebral correlates of amygdala responses during non-conscious perception of facial affect in adolescent and pre-adolescent children. Cogn Neurosci,


82. Rupp, TL, **Killgore, WD**, & Balkin, TJ. Socializing by day may affect performance by night: Vulnerability to sleep deprivation is differentially mediated by social exposure in extraverts vs. introverts. Sleep, 33: 1475-1485, 2010.


89. **Killgore, WD**, Capaldi, VF, & Guerrero, ML. Nocturnal polysomnographic correlates of daytime sleepiness. Psychol Rep, 110(10), 63-72, 2012.


100. **Killgore, WD**. Self-reported sleep correlates with prefrontal-amygdala functional connectivity and emotional functioning. Sleep, 36, 1597-1608, 2013.


**Book Chapters/Editorials**


16. **Killgore, WD.** Lighting the way to better sleep and health (Editorial). Journal of Sleep Disorders: Treatment and Care, 5:1.


**Published U.S. Government Technical Reports**


**WORKS IN PROGRESS**


4. **Killgore, WD.** Individual differences in rested activation of the ventral striatum predicts overeating during sleep deprivation. (in preparation).

5. **Killgore, WD,** Tkachenko, O, Rauch, SL, & Nickerson, LD. Multimodal neuroimaging at rested baseline predicts resistance to overnight sleep deprivation. (in preparation).


8. Sneider, JT, Jensen, JE, Silveri, MM, & **Killgore, WD.** Prefrontal GABA predicts resistance to
sleep deprivation. (in preparation).


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 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]

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 *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]


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]

2014  Lecture entitled *Supporting Cognitive and Emotional Health in Warfighters*. Presented to the Senior Vice President 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]


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]


2007  Lecture on *Cerebral Responses During Visual Processing of Food*, U.S. Army Institute of Environmental Medicine, Natick, MA [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]

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 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]


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 *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 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 In Progress Review (IPR) Briefing, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD [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.
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<td>2004</td>
<td>Lecture on <em>Sleep Deprivation, Cognition, and Stimulant Countermeasures</em></td>
<td>Seminar Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Detrick, MD, U.S. Army Medical Research and Materiel Command [Invited Lecture]</td>
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<td>2004</td>
<td>Lecture on the <em>Regional Cerebral Blood Flow Correlates of Electroencephalographic Activity During Stage 2 and Slow Wave Sleep: An H215O PET Study</em></td>
<td>Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Detrick, MD, U.S. Army Medical Research and Materiel Command [Invited Lecture]</td>
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<td>2006</td>
<td>Lecture on <em>The Sleep History and Readiness Predictor</em></td>
<td>Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Rucker, AL, U.S. Army Medical Research and Materiel Command [Invited Lecture]</td>
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<td>2008</td>
<td>Lecture on <em>Sleep Deprivation, Executive Function, &amp; Resilience to Sleep Loss</em></td>
<td>First Franco-American Workshop on War Traumatism, IMNSSA, Toulon, France [Invited Lecture]</td>
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<td>2009</td>
<td>Symposium Entitled <em>Sleep Deprivation, Judgment, and Decision-Making</em>, 23rd Annual Meeting of the Associated Professional Sleep Societies, Seattle, WA [Invited Symposium]</td>
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<td>2009</td>
<td>Symposium Session Moderator for <em>Workshop on Components of Cognition and Fatigue: From Laboratory Experiments to Mathematical Modeling and Operational Applications</em>, Washington State University, Spokane, WA [Invited Speaker]</td>
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<td>2009</td>
<td>Lecture on <em>Comparative Studies of Stimulant Action as Countermeasures for Higher Order Cognition and Executive Function Impairment that Results from Disrupted Sleep Patterns</em>, Presented at the NIDA-ODS Symposium entitled: Caffeine: Is the Next Problem Already Brewing, Rockville, MD [Invited Lecture]</td>
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<td>2010</td>
<td>Oral Platform Presentation entitled <em>Sleep deprivation selectively impairs emotional aspects of cognitive functioning</em>, 27th Army Science Conference, Orlando, FL. [Submitted Presentation]</td>
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<td>2010</td>
<td>Oral Platform Presentation</td>
<td><em>Exaggerated amygdala responses to masked fearful faces are specific to PTSD versus simple phobia, 27th Army Science Conference, Orlando, FL. [Submitted Presentation]</em></td>
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<td>2012</td>
<td>Oral Symposium Presentation</td>
<td><em>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]</em></td>
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<td>2012</td>
<td>Oral Platform Presentation</td>
<td><em>Shared and unique patterns of cortico-limbic activation across anxiety disorders. 40th Meeting of the International Neuropsychological Society, Montreal, Canada. [Submitted Presentation]</em></td>
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<td>2013</td>
<td>Lecture</td>
<td><em>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]</em></td>
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<td>2014</td>
<td>Symposium</td>
<td><em>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]</em></td>
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<td>2014</td>
<td>Symposium</td>
<td><em>The Effects of Sleep Loss on Food Preference, SLEEP 2014, Minneapolis, MN [Invited Symposium]</em></td>
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<td>2015</td>
<td>Symposium</td>
<td><em>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]</em></td>
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<td>2015</td>
<td>Lecture</td>
<td><em>Predicting Resilience to Sleep Loss with Multi-Modal Neuroimaging. Invited presentation at the DARPA Sleep Workshop 2015, Arlington, VA [Invited Lecture]</em></td>
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<tr>
<td>2015</td>
<td>Symposium</td>
<td><em>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]</em></td>
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<tr>
<td>2015</td>
<td>Oral Platform presentation</td>
<td><em>Multimodal Neuroimaging to Predict Resistance to Sleep Deprivation, Associated Professional Sleep Societies (APSS) SLEEP meeting, Seattle, WA [Submitted Presentation]</em></td>
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<td>2015</td>
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<td><em>Sleep Deprivation and Emotional Decision Making, Virginia Tech Sleep Workshop, Arlington, VA [Invited Symposium]</em></td>
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<td>2016</td>
<td>Oral Platform presentation</td>
<td><em>Default Mode Activation Predicts Vulnerability to Sleep Deprivation in the Domains of Mood, Sleepiness, and Vigilance, Associated Professional Sleep Societies (APSS) SLEEP meeting, Denver, CO [Submitted Presentation]</em></td>
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Peer Reviewed Published Abstracts


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.


11. **Killgore, WD, Glosser, G, King, D, French, JA, Baltuch, G, & Detre, JA.** Functional MRI


33. Killgore, WD, Young, AD, Femia, LA, Bogorodzki, P, Rogowska, J, & Yurgelun-Todd, DA.


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,


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.


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...


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.


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


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 you 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.


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.


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


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.


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.

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.


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. 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.


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.


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,


122. **Killgore, WD**, Rupp, TL, Killgore, DB, Grugle, NL, and Balkin, TJ. Differential effects of

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.


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.

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.


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.


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.


153. Rupp, TL, **Killgore, WD**, & Balkin, TJ. Extraverts may be more vulnerable than introverts to


164. Rupp, TL, Killgore, WD, & Balkin, TJ. Evaluation of personality and social exposure as


185. Schwab, ZJ, Weiner, MR, Rauch, SL, & Killgore, WD. Emotional and cognitive intelligence:


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


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


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*]


IM, Simon, NM, Pollack, MH, & Rauch, SL. Comparing categorical versus dimensional
predictors of functional response across three anxiety disorders. Abstract presented at the 68th

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

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

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

matter correlates of posttraumatic stress disorder—A voxel based morphometry study.

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

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

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

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

Rauch, SL. A functional magnetic resonance imaging study of rostral anterior cingulate cortex
activation in obsessive-compulsive disorder using an emotional counting stroop paradigm.


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


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.

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.


Neuropsychological Society, Denver, CO, February 4-7, 2015.


322. Sneider, JT, Jensen JE, Silveri, MM, & **Killgore, WD**. Prefrontal GABA predicts resistance to


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.


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.


361. 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


379. Rhee, JU, Haynes, P, Chakravorty, S, Patterson, F, **Killgore, WD**, Gallagher, RA, Carrazco, N,


AWARDED GRANTS AND CONTRACTS

Completed

            NIH, 1R03HD41542-01  
            PI: Killgore ($79,000.)

            U.S. Army Medical Research and Materiel Command (USAMRMC) Competitive Medical Research Proposal Program (CMRP); Intramural Funding,  
            PI: Killgore (Total Award: $1,345,000.)

2004-2005  Sleep/wake Schedules in 3ID Aviation Brigade Soldiers.  
            Defense Advanced Research Projects Agency (DARPA)  
            PI: Killgore (Total Award: $60,000.)

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: $219,400.)

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: $154,000.)

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: $291,000.)

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: $551,961.)  
            Major Goal: To identify the neurobiological basis of cognitive and emotional intelligence using functional and structural magnetic resonance imaging.
2011-2014  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: $941,924)
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: $505,065)
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: $445,531)
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: $1,646,045)
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.

Current

2012-2016  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: $2,272,098)
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.

2014-2017  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: $1,853,921)
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.

2014-2018 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: $3,821,415)
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.

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: $4,373)
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.

2014-2018 Refinement and Validation of a Military Emotional Intelligence Training Program (JW150005) Joint Warfighter Medical Research Program 2015
PI: Killgore (Total Award: $5,977,570)
Percent Effort: 45%
Major Goal: To develop and validate a new internet-based training program to enhance emotional intelligence capacities in military Service Members.

LIST OF COLLABORATORS ON GRANTS AND PUBLICATIONS FROM LAST FIVE YEARS
Acharya, D. 
Alkozei, Anna 
Athey, A. J. 
Baker, Justin. T. 
Balkin, Thomas J. 
Bark, John S. 
Brennan, Brian P. 
Britton, Jennifer C. 
Bruyere, J. 

Buchholz, Jennifer L. 
Capaldi, Vincent F. 
Castro, Carl A. 
Chosak, A. 
Cohen-Gilbert, Julia E. 
Conrad, Turner A. 
Covell, Michael J. 
Crowley, David J. 
Cui, Jiaolong
Dagher, Joseph
Dahlgren, Mary Kate
Deckersbach, Thilo
DelDonno, Sophie R.
Demers, Lauren A.
Dillon, Daniel G.
Divatia, Shreya C.
Dougherty, Darin
Engle, Charles C.
Estrada, Arthur
Freed, Michael C.
Fridman, Andrew
Fukunaga, Rena
Ginsberg, Jay P.
Gogel, Hannah
Gold, Andrea L.
Gonenc, Atilla
Gruber, Staci A.
Grugle, Nancy, L.
Guerrero, Melanie L.
Hammeroff, Stuart
Hartman, A. S.
Hezel, D.
Hoge, Charles W.
Hudson, James I.
Jenike, Michael A.
Jensen, J. Eric
Jorgensen, Alli L.
Juelich, R. J.
Kamimori, Gary H.
Kamiya, T.
Kaufmann, Marc
Kawada, Y.
Kelley, Amanda M.

Killgore, Desiree B.
Kipman, Maia
Kizielewicz, Jill
Knight, Sara A.
Koehlmoos, T. P.
Krizan, Zlatan
Krupnick, J.
Lane, Richard
Lasko, N. B.
Laundau, A. J.
Leibenluft, E.
Makris, Nicos
Marin, M. F.
Markowski, Sarah M.
Meloni, Edward G.
Milad, Mohammed R
Mundy, Elizabeth A.
Nickerson, Lisa D.
Novak, L.A.
Olson, Elizabeth A.
Orr, Scott P.
Pace-Schott, Edward F.
Papadimitriou, G.
Pauls, D. L.
Pechtel, Pia
Penetar, David M.
Pine, Daniel S.
Pisner, Derek
Pitman, R. K.
Pizzagalli, Diego A.
Pollack, M. H.
Pope, Harrison G.
Post, Alex
Preer (Sonis), Lilly
This is a true and accurate statement of my activities and accomplishments. I understand that misrepresentation in securing promotion and tenure may lead to dismissal or suspension under ABOR Policy 6-201 J.1.b.
William D. “Scott” Killgore, Ph.D.