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**TITLE:** Identification of and At-Risk Interventions for Pre-Deployment Psychophysiologic Predictors of PostDeployment Mental Health Outcomes

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Fort Detrick, Maryland 21702-5012

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14. ABSTRACT

Objectives and Rationale: The primary objectives of this study (Warriors Achieving Resilience or WAR) were to develop objective pre-deployment predictors of PTSD and test two pre-deployment resiliency interventions. Objective predictors include: 1) physiologic reactivity to combat-related virtual reality environments and white noise startle and 2) cognitive bias assessment. We also will test two pre-deployment resiliency interventions: 1) video game-based heart rate variability biofeedback training and 2) computerized cognitive bias training. Objective assessment and training measures are more reliably measured and could be early indicators of resilience/vulnerability.

Study Design: Longitudinal prediction study and randomized controlled trial to prevent post-deployment PTSD symptoms. 600 soldiers were consented with the goal of completing 500 pre-deployment assessments. Pre-deployment data collection for was completed for 427 soldiers, 411 soldiers deployed. Subjects were randomized to one of three groups: heart rate variability (HRV) biofeedback training, cognitive bias feedback training, or no additional training. iPods with respective apps were provided to the soldiers in the resilience training groups. Follow-up data was collected at 3- and 12- months post-deployment, 308/411 (75%) and 236/411 (57%), respectively. PTSD symptom severity was measured using the PTSD Checklist.

Major Findings: Pre-deployment HRV (measured by the standard deviation of beat to beat intervals or SDNN) was a significant predictor of 3-month post-deployment PTSD symptoms. Low HRV is associated with increased physical and emotional stress. The time between pre-deployment SDNN and post-deployment PTSD symptom measurement was approximately one year. There was an expected inverse relationship between pre-deployment SDNN and 3-month post-deployment PTSD symptoms (beta=-0.002, p=0.006) in a multivariate model with a continuous measure of PTSD symptoms. When comparing the lowest SDNN quartile to the highest SDNN quartile, the lowest SDNN quartile had 3.6 times greater odds of meeting or exceeding the PTSD threshold of 35. At 3-months post-deployment the HRV biofeedback group demonstrated significantly lower total PTSD scores compared to the control group in soldiers 26 years of age and older (p<0.05). There were no significant differences in the younger soldiers (25 years of age and younger) or in total PTSD scores at 12 months.

Soldiers were randomized at the company level to HRV biofeedback, cognitive bias feedback, or no feedback groups in order to minimize app sharing across intervention groups. In a multivariate model, there were significant two-way interactions (study group*time and study group*age where age was dichotomized using a median split at 26 years of age). The corresponding three-way interaction term (study group*time*age) was also significant. At 3-months post-deployment the HRV biofeedback group demonstrated significantly lower total PTSD scores compared to the control group in soldiers 26 years of age and older (p<0.05). There were no significant differences in the younger soldiers (25 years of age and younger) or in total PTSD scores at 12 months.

Project Status: Data collection complete, primary data analyses complete with ongoing secondary data analysis.

Potential Impact: Low pre-deployment HRV is a significant objective predictor of post-deployment PTSD symptom severity and HRV biofeedback decreases the risk of PTSD symptoms in soldiers 26 years of age and older. This study identified an objective risk factor and tested an intervention specific to this risk factor. The products from this study are an objective model for pre-deployment PTSD risk assessment and evidence to support HRV-based PTSD resiliency training.

15. SUBJECT TERMS

PTSD, Mental Health, Prevention, Prediction

16. SECURITY CLASSIFICATION OF:

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17. LIMITATION OF ABSTRACT

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Introduction
The purpose of this research study is to identify objective pre-deployment predictors for post-deployment post-traumatic stress disorder (PTSD) and to test two pre-deployment interventions designed to reduce post-deployment mental health problems. A total of 600 Army National Guard or Reserve members who are planning to deploy for Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) operations within the next 12 months will be recruited for the study.

Body
All tasks outlined in the Statement of Work are addressed below.

Task 1: Complete IRB review and approval processes for this study (Mos. 1-4):
- Obtain IRB approval at Central Arkansas Veterans Healthcare System and sites for human subject data collection (Mos. 1-4). Pyne, CAVHS

Progress: Complete. This study received approval from the Central Arkansas Veterans Healthcare System (CAVHS) and DoD IRBs. Subjects were recruited from two Virginia National Guard units.

Gaining access to Army National Guard leadership to talk with them about participating in this study was more difficult than we had anticipated. Leaders from several states either refused to participate or did not have units deploying.

Task 2: Hire and train project coordinator and research assistants necessary to complete data collection (Mos. 1-9):
- Hire and train project coordinator and two research assistants (Mos. 1-6). Pyne, CAVHS
- Hire and train one research assistant (Mos. 1-6). Constans, SLVHCS

Progress: Complete. The project coordinator and research assistants were identified and/or hired and were trained to complete data collection.

Task 3: Modify existing virtual reality combat environments and interface with physiologic reactivity equipment (Mos. 1-6):
- Review with National Guard personnel at recruitment sites the most likely combat exposures for their personnel (Mos. 1-3). Pyne, CAVHS
- Modify virtual reality combat environments from existing library at VRMC to produce brief standardized virtual reality environments for study (Mos. 1-5). Wiederhold, VRMC
- Deliver virtual reality combat environments loaded on laptop computers with physiologic reactivity monitoring equipment interface (Mos. 6). Wiederhold, VRMC

Progress: Complete. Being transported in a convoy appeared to be the most ubiquitous combat exposure for OEF/OIF deployments. A virtual reality convoy scenario was developed and loaded on laptop computers.

Task 4: Modify existing video game stress inoculation biofeedback training for use in the study (Mos. 1-6):
- Modify existing video game stress inoculation biofeedback training (Mos. 1-6). Wiederhold, VRMC
• Deliver video game stress inoculation biofeedback training software on laptop computers (Mos. 6). Wiederhold, VRMC

Progress: Complete. The video game stress inoculation biofeedback training was adapted from a civilian version developed by Ease Interactive, Inc. and loaded on laptop computers.

Task 5: **Modify existing cognitive bias assessment tool for use in military population (Mos. 1-6):**
- Review with National Guard personnel the prototype military version of the cognitive bias assessment tool (Mos. 1-3). Constans, SLVHCS
- Modify existing non-military cognitive attribution bias assessment tool for use in military population (Mos.1-6). Constans, SLVHCS
- Load military cognitive bias assessment software loaded on laptop computers for use in proposed study (Mos. 6). Wiederhold, VRMC

Progress: Complete. The cognitive bias assessment tool was reviewed by approximately 15 National Guard and other deployed personnel. Modifications were made to make the scenarios more realistic and believable and loaded onto laptop computers.

Task 6: **Modify existing cognitive attribution bias training for use in the proposed study (Mos. 1-6):**
- Modify existing cognitive bias modification training for use in military population (Mos.1-5). Constans, SLVHCS
- Load cognitive bias modification training software on laptop computers and handheld devices (Mos.6). Wiederhold, VRMC

Progress: Complete. The final laptop and handheld versions of the cognitive attribution bias training were completed and loaded onto laptop computers and handheld devices (iPod Touch). The training programs (Breath Pacer and IMAT apps) are available for downloading at the Apple Store.

Task 7: **Train research assistants to deliver preventive trainings and collect pre-deployment data (Mos. 3-6):**
- Train research assistants to deliver physiologic reactivity training (Mos. 3-6) Kimbrell, UAMS
- Train research assistants to collect cognitive bias data and deliver cognitive attribution training (Mos. 3-6) Constans, SLVHCS
- Train research assistants to collect pre-deployment data (Mos. 3-6) Kramer, UAMS

Progress: Complete. Several group training sessions were held to train research assistants. Individual training continued until the time of data collection.

Task 8: **Pilot test virtual reality combat environment physiologic reactivity assessment, video game stress inoculation biofeedback training, cognitive bias assessment, and cognitive attribution bias training (Mos. 6-9):**
- Pilot test above assessments and trainings in 10-20 civilian and OIF/OEF combat veterans (Mos. 6-9). Pyne, CAVHS
- Pilot testing will be completed without the use of DoD funding (Mos. 6-9). Pyne, CAVHS
- Make appropriate modifications to virtual reality combat environments and video game stress inoculation biofeedback training based on pilot testing results (Mos. 6-9). Wiederhold, VRMC
- Make appropriate modifications to cognitive bias assessment and training based on pilot testing results (Mos. 6-9). Constans, SLVHCS

**Progress:** Complete. The above trainings and assessments were pilot tested with approximately 15 civilian and OIF/OEF combat veterans. Modifications were based on feedback received and included changes in the virtual reality combat scene story boards and virtual reality environments to improve immersion and believability of portrayed military threats and the need to personalize cognitive bias scenarios.

**Task 9:** Collect pre-deployment physiologic reactivity and cognitive attribution bias data from Army National Guard members (N=500) (Mos. 9-15):
- Recruit and consent National Guard subjects within 6 months of OIF/OEF deployment (Mos. 9-15). Pyne, CAVHS
- Collect pre-deployment physiologic reactivity and cognitive attribution bias data (Mos. 9-15). Pyne, CAVHS

**Progress:** Complete. A protocol modification was approved to recruit 600 soldiers in order to complete 500 pre-deployment assessments because we realized that not all recruited soldiers would be able to complete a separate pre-deployment assessment. A total of 600 subjects were recruited from two Virginia Army National Guard units. Consenting took place during pre-deployment Soldier Readiness Check (SRC) weekends. Of the 600 subjects that consented to be in the study, 427 completed pre-deployment baseline assessments during pre-deployment training. The remaining 173 subjects either voluntarily dropped from the study or did not contact research personnel to schedule appointments for their baseline assessment.

All baseline assessments were completed on an Army National Guard training base (Ft. Pickett, VA) during the time that the soldiers were completing their pre-deployment training. The major barrier to completing the assessments was the soldier’s rigorous training schedules. That being said, soldiers were willing to complete assessments well into the early morning hours.

- Define baseline physiologic reactivity variables (Mos. 7-18). Tan, MEDVAMC
- Refine analysis plan for pre-deployment data (Mos. 7-18). Williams, UAMS

**Progress:** Pre-deployment data collection was completed in May 2011.

**Task 10:** Randomize pre-deployment National Guard members and/or Army reserve members to resiliency training or no intervention (Mos. 9-15):
- Use block randomization design to randomize pre-deployment National Guard and/or Army Reserve members to physiologic reactivity training, cognitive attribution training, or no intervention (Mos. 9-15). Pyne, CAVHS

**Progress:** Complete. See attached randomization procedures (Appendix A) and randomization results (Appendix B).

**Task 11:** Modify existing virtual reality civilian environments and interface with physiologic reactivity equipment (Mos. 18-24):
• Modify virtual reality civilian environments from existing library at VRMC to produce brief standardized civilian virtual reality environments for study (Mos. 18-23). Wiederhold, VRMC
• Deliver virtual reality civilian environments loaded on laptop computers with physiologic reactivity monitoring equipment interface (Mos. 24). Wiederhold, VRMC

Progress: Complete. The virtual reality civilian environment was modified to improve virtual reality immersion and the believability of the civilian stressors and loaded on laptop computers.

Task 12: Pilot test virtual reality civilian environment physiologic reactivity assessment (Mos. 24-27):
• Pilot test above assessments and trainings in 10-20 civilian and OIF/OEF combat veterans (Mos. 24-27). Pyne, CAVHS
• Pilot testing will be completed without the use of DOD funding (Mos. 24-27). Pyne, CAVHS
• Make appropriate modifications to virtual reality civilian environment based on pilot testing results (Mos. 24-27). Wiederhold, VRMC

Progress: Complete. The above assessment was been pilot tested with approximately 15 civilian and OIF/OEF combat veterans. Modifications were based on feedback received and included equal time (90 seconds) for the low and high simulated stress and fading to black screen at the completion of the virtual reality scenarios.

Task 13: Train research assistants to collect post-deployment data (Mos. 21-27):
• Train research assistants to collect post-deployment interview data (Mos. 21-27) Kramer, UAMS
• Train research assistants to collect post-deployment physiologic reactivity data (Mos. 21-27) Kimbrell, UAMS
• Train research assistants to collect cognitive bias data (Mos. 21-27) Constans, SLVHCS

Progress: Complete. Several group and individual training sessions were held to train research assistants to collect the post-deployment data. Training sessions were held for each individual task listed above to include role playing between research assistants until all were comfortable with the data collection procedures.

Task 14: Collect post-deployment data (Mos. 27-42):
• Collect 3-month post-deployment physiologic reactivity, cognitive attribution bias, and interview data (Mos. 27-33). Pyne, CAVHS

Progress: Complete: The 3-month (early post-deployment) data collection was completed on September 14, 2012. Assessments were completed both in-person and over the phone.

The pre-deployment data collection took an average of 1 hour and 20 minutes. The only physiologic reactivity measurement that was not done in follow-up was the eye-blink startle (the other acoustic startle measures were collected) and this did not change the time to any appreciable extent. Heart rate and skin conductance startle reactivity measures were collected but the eye-blink startle was not because the data recording rate is too slow to provide meaningful eye-blink response but is fine for heart rate and skin conductance. The Virginia Army National Guard advised us that a 2-hour post-deployment assessment was not feasible.
and it would be best to keep it close to 1 hour and 30 minutes. Therefore, we deleted measures that either were duplicative to some degree or replaced longer with shorter measures in order to stay within this time frame. In addition, we collected physiologic reactivity data at the early post-deployment follow-up but not the one year post-deployment follow-up because physiologic reactivity data will be used to predict future symptoms and assessments beyond one year were not planned.

The in-person assessments (includes physio measurements) were completed during a total of 4 drill weekends and 1 Reverse SRP (Soldier Readiness Program). The major barriers to completing the in-person assessments were competing with the soldier’s busy schedules and the amount of time required per assessment (1.5 hours per soldier). A total of 282 early post-deployment assessments were completed in-person.

Attempts were made to contact the remaining soldiers by phone to complete paper and pencil assessments (no physio). Completing the remaining assessments by phone proved to be a major challenge. Many of the soldiers had incorrect contact information, others did not answer their phone, and several were scheduled for interviews but did not answer when the research assistant called them back to conduct the interview. A total of 26 assessments were completed by phone which brought the total number of assessments completed to 308 (in-person and phone) and resulted in a follow-up rate of 74% (308/418). Although we did not meet our follow-up goal of 80%, we are satisfied with 74% in light of the barriers that were encountered. See the table (Appendix C) for details.

- Collect 12-month post-deployment physiologic reactivity, cognitive attribution bias, and interview data (Mos. 36-42). Pyne, CAVHS

**Progress:** Partially complete. We did not collect physiologic reactivity or cognitive attribution bias data at 12-months because this was the last interview and there were no plans to collect outcome data after 12-months post-deployment.

The 12-month post-deployment data collection was completed in-person, over the phone, and by mail.

The assessments included paper and pencil questionnaires only. The in-person assessments were completed during a total of 4 Medical Readiness Events and 1 drill weekend. The major barriers to completing the in-person assessments were competing with the soldier’s busy drill weekend schedules and the lack of available incentives to complete the follow-up assessments. A total of 165 12-month post-deployment assessments were completed in-person.

A total of 240 participants that did not complete the 12-month post-deployment interview in person received questionnaires in the mail (some participants received more than one questionnaire in the mail). Participants were asked to complete the questionnaires and return them in a self-address postage-paid envelope. Participants who did not return the questionnaires were contacted by phone and given the option of having the interviewer administer the questionnaires to them over the phone or completing and returning them by mail. Follow-up calls were made to participants who agreed to return the questionnaires but did not. The major barriers to completing the assessments by mail included incorrect contact information, soldiers not answering the phone, and not following through after they agreed to complete and return the questionnaires. A total of 69 assessments were completed by mail and 2 assessments were completed over the phone. Overall, a total of 236 12-month post-
deployment assessments were completed and resulted in a 12-month follow-up rate of 57% (236/411). See the table (Appendix D) for details.

- Define post-deployment physiologic reactivity variables (Mos. 27-42). Tan, MEDVAMC

**Progress:** Complete. Heart rate variability variables were defined in consultation with HeartMath and members of the Advisory Panel. The inter-beat interval (IBI) data collected for use in calculating heart rate variability required an additional (unplanned) data conversion step. The data collected as IBI was recorded at a fixed frequency (every 250 msec) and needed to be converted to a true IBI value. This conversion was completed by personnel at HeartMath.

- Refine analysis plan for post-deployment data (Mos. 27-42). Williams, UAMS

**Progress:** Complete

**Task 15: Data analysis and report writing (Mos. 42-48):**

- Complete data analysis and report writing (Mos. 42-48). Pyne, CAVHS

**Progress:** Primary data analysis is complete for HRV predictors for 3-month post-deployment PTSD symptoms and for the resilience trainings (HRV and cognitive bias) at 3- and 12-months post-deployment. Cognitive bias prediction of post-deployment PTSD is ongoing as is the predictors of 12-month PTSD symptom severity.
Key Research Accomplishments

- IRB approval obtained from Central Arkansas Veterans Healthcare System and DoD
- Hired Project Coordinator and Research Assistants
- Modified pre-deployment assessments and trainings
- Trained research assistants to deliver preventive trainings and collect pre-deployment data
- Pilot tested pre-deployment assessments and trainings
- Modified and pilot tested the virtual reality civilian environment
- Identified a recruitment site
- Training apps approved by Apple Store - Getting new apps into the Apple Store was more difficult than anticipated due to criteria for acceptance changed while we were in the process of submitting the apps for approval. We were told that the apps were not entertaining enough and that they did not appeal to a wide enough audience. With more justification (e.g. potential use by thousands of soldiers), we succeeded in getting approval.
- Collecting data from 427 soldiers during their pre-deployment training was a huge accomplishment. Contributing factors included 1) Use of iPod Touch device; 2) Willingness of research team to collect data on soldiers whenever they were available; 3) Support of commanders – providing space and allowing soldiers time to participate in the study.
- Collecting the Early Post-deployment data from 308 soldiers during their drill weekends, Reverse SRP, and over the phone was a huge accomplishment. Contributing factors included 1) Willingness of research team to collect data on soldiers whenever they were available; 2) Support of commanders – providing space and allowing soldiers time to participate in the study.
- Collecting the 12-month Post-deployment data from 236 soldiers during their drill weekends, Medical Readiness Events, by mail, and over the phone was a huge accomplishment. Contributing factors included 1) Willingness of research the team to travel to various locations in Virginia to collect data on soldiers whenever they were available; 2) Support of commanders – providing space and allowing soldiers time to participate in the study.
Reportable Outcomes

Presentations to date


Products/tools developed by this project

- **Physiologic reactivity assessment using virtual reality convoy stimulus** – heart rate, heart rate variability, and skin conductance will be measured before, during, and after the virtual reality stimulus.

- **Alive** – Self-paced learning software program designed to facilitate rapid acquisition of the emotional self-management skills needed for resilience under pressure. Alive fuses Heart Rate Variability feedback cues with the engagement of computer games.

- **Cognitive Bias Assessment Program** – Serves as a non-self-report measure of negative cognitive bias. Use of this program will allow researchers to determine participants who may be at high risk for trauma-related distress because of negative cognitive bias.

- **Cognitive Bias Training Program** – Modification of negative cognitive bias is the target of the Cognitive Training Program. By learning how to make positive attributions about events, one can change biases in thinking and lessen their chance for psychological distress.

Publications to date

- In press. Nanney JT, Constans JI, Kimbrell TA, Kramer TL, Pyne JM. Differentiating between appraisal process and product in cognitive theories of posttraumatic stress. *Psychological Trauma: Theory, Research, Practice, and Policy*. This paper makes use of the cognitive bias assessment data and examines the relationship between cognitive appraisal process (cognitive bias data) and appraisal products (post-traumatic cognitions inventory) and confirmatory factor analysis suggest that the appraisal process and the products of that process (i.e., beliefs) are indeed distinct. Structural equation modeling results are consistent with cognitive bias and social information processing literatures which posit that biased appraisal process may contribute to the development of dysfunctional beliefs and emotional disorders following trauma. The potential utility of distinctly conceptualizing and measuring the appraisal process in both clinical and research settings is discussed. A follow-up paper which examines the longitudinal relationship between pre-deployment cognitive bias and post-deployment PTSD is in preparation.

- In review. Call DW, Pitcock J, Pyne JM. Longitudinal evaluation of the relationship between mindfulness, general distress, anxiety, and PTSD in a recently deployed National Guard sample.

- In preparation. Heart rate variability: an objective pre-deployment predictor of post-deployment PTSD symptoms. Results from this paper are summarized below.
• In preparation. Results from a pre-deployment heart rate variability and cognitive bias feedback interventions to prevent post-deployment PTSD. Results from this paper are summarized below.
Conclusions: Results of the prediction analyses which address Specific Aim 1 (pre-deployment heart rate variability predicting 3-month post-deployment PTSD symptom severity) are summarized in the tables below. As mentioned above, 308 soldiers completed the 3-month post-deployment assessment. Usable pre-deployment HRV data was available for 91.9% (283/308) of soldiers who completed the 3-month post-deployment assessment. Reasons for unusable HRV data included: excessive movement artifact and equipment malfunction. Approximately The PTSD checklist (PCL) score was the primary outcome measure and was not normally distributed; therefore, generalized linear models were used and best fit was with a gamma distribution and log link. The dichotomous PCL outcome used a cut-off score of 35 or greater which is recommended for samples where the prevalence is expected to be less than 15%. The dichotomous measure of SDNN was derived using the lowest and highest SDNN quartiles in logistic regression equations. Candidate sociodemographic and military experience covariates were chosen based on literature review and included in the multivariate analysis predicting post-deployment PTSD symptom severity (dependent variable) based on bivariate association with post-deployment PTSD symptom severity, p<0.2. Tables 1 and 2 summarize the results for reduced and full models with a continuous and dichotomous PCL outcome, respectively. Specific Aim 2 (3-month post-deployment heart rate variability predicting 12-month post-deployment PTSD symptom severity) results are pending.

Table 1. Reduced and Full Models of Pre-deployment Continuous Heart Rate Variability Predicting Post-deployment PCL (n=283)

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<th>Variable</th>
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<td>Reduced Model</td>
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<tr>
<td>Age</td>
<td>0.0005</td>
<td>0.804</td>
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<tr>
<td>Pre-deployment PCL</td>
<td>0.0214</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pre-deployment SDNN</td>
<td>-0.003</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Full Model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.007</td>
<td>0.764</td>
</tr>
<tr>
<td>Race (1=Caucasian, 0=non-Caucasian)</td>
<td>-0.108</td>
<td>0.008</td>
</tr>
<tr>
<td>Marital (1=Married/Cohabiting, 0=Other)</td>
<td>-0.020</td>
<td>0.624</td>
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<tr>
<td>Tobacco Use (1=Yes, 0=No)</td>
<td>0.004</td>
<td>0.911</td>
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<tr>
<td>Childhood Abuse (1=Yes, 0=No)</td>
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<tr>
<td>Previous Deployment to Combat Zone (1=Yes, 0=No)</td>
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<td>Most Recent Combat Experiences</td>
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<td>Pre-deployment PCL</td>
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<td>Pre-deployment SDNN</td>
<td>-0.002</td>
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Table 2. Reduced and Full Models of Pre-deployment Dichotomous Heart Rate Variability Predicting Post-deployment PCL (n=141)

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<th>Variable</th>
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<tr>
<td>Reduced Model</td>
<td></td>
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<tr>
<td>Age</td>
<td>0.977 (0.922, 1.035)</td>
<td>0.429</td>
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<tr>
<td>Pre-deployment PCL</td>
<td>1.164 (1.094, 1.237)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pre-deployment SDNN Quartiles (lowest quartile (n=70) vs highest quartile (n=71))</td>
<td>3.678 (1.240, 10.905)</td>
<td>0.019</td>
</tr>
<tr>
<td>Full Model</td>
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</table>
To our knowledge, this is the first study to demonstrate pre-deployment HRV to be a significant predictor of post-deployment PTSD symptom severity. The inverse relationship between HRV and PTSD symptom severity is expected as low pre-deployment HRV was hypothesized as a risk factor for post-deployment PTSD symptoms.

Results of the resilience training outcomes which address Specific Aim 3 are summarized in the table and graph below. Soldiers were randomized at the company level to HRV biofeedback, cognitive bias feedback, or no feedback groups in order to minimize app sharing across intervention groups. HRV biofeedback and cognitive bias feedback interventions included one hour self-paced training using laptop computers and orientation to iPod with an app which corresponded to the soldier’s assigned study group. Randomization was done at the company level to minimize app sharing. To account for the clustering of subjects within company and the positive skewness of the continuous PCL-M score, generalized linear mixed models were used and a gamma distribution with log link was the best fit for the data. Covariates were chosen for the full model if there were differences between the study arm groups at p<0.2 or bivariate correlations between PCL-M follow-up scores and candidate covariates at p<0.2. Interaction terms were also tested and the only significant two-way interaction terms were study group*time and study group*age where age was dichotomized using a median split at 26 years of age. The corresponding three-way interaction term (study group*time*age) was also significant. Therefore, the predicted means in Table 3 are presented by age group and time.

### Table 3. Predicted mean PTSD severity score by time, age groups and study arms

<table>
<thead>
<tr>
<th>Time</th>
<th>Age 25 years or younger</th>
<th>Age 26 years or older</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cognitive Bias</td>
<td>Biofeedback</td>
</tr>
<tr>
<td><strong>Baseline</strong> (n=343)</td>
<td>24.42</td>
<td>21.67*</td>
</tr>
<tr>
<td><strong>3 month follow-up</strong></td>
<td>26.29</td>
<td>26.24</td>
</tr>
<tr>
<td>(n=307)</td>
<td>24.34</td>
<td>25.99</td>
</tr>
</tbody>
</table>
At 3-months post-deployment the HRV biofeedback group demonstrated significantly lower total PTSD scores compared to the control group in soldiers 26 years of age and older (p<0.05). There were no significant differences in the younger soldiers (25 years of age and younger) or in total PTSD scores at 12 months.
Low pre-deployment HRV is a significant objective predictor of post-deployment PTSD symptom severity and HRV biofeedback decreases the risk of PTSD symptoms in soldiers 26 years of age and older. This study identified an objective risk factor and an intervention to decrease this risk. The products from this study are an objective model for PTSD risk assessment and evidence to support pre-deployment HRV-based PTSD resiliency training.
APPENDICES.

A. Randomization Procedure
B. Randomization Results
C. Summary of 3-month Post-Deployment Follow-up Assessments
D. Summary of 12-month Post-Deployment Follow-up Assessments
E. Personnel Receiving Pay from the Research Effort
F. Variable Codebook
APPENDIX A

Randomization Procedures

- Participants were randomized to one of three training arms: breath pacing, cognitive bias, or no additional training.

- The unit of randomization was the smallest naturally occurring unit that was most likely be in close proximity during deployment (e.g. squad or platoon). This was done in order to limit training intervention cross-over that is very likely if soldiers who work in close proximity are assigned to different training intervention arms. The precise unit of randomization was decided in consultation with command leadership. The randomization scheme was 1:1:1 by unit across training intervention arms and was based on results from a random number generator.

- Randomization was stratified by company or troop under the assumption that there may be factors that could affect outcomes that were specific to a given company or troop, e.g., assignment, culture, etc. Headquarter companies were randomized separately. We monitored the number of subjects who were recruited into each arm and modified randomization strategies such that at the end of recruitment we had equal numbers of subjects in each of the training arms. A larger number of subjects was in the no additional training arm and this will enhance our power to detect outcome differences between the training arms and the control group.
## APPENDIX B

### Randomization Results

<table>
<thead>
<tr>
<th>Arm</th>
<th>Battalion 1</th>
<th>Battalion 2</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofeedback</td>
<td>40</td>
<td>86</td>
<td>126</td>
</tr>
<tr>
<td>Cognitive</td>
<td>31</td>
<td>95</td>
<td>126</td>
</tr>
<tr>
<td>Control</td>
<td>47</td>
<td>128</td>
<td>175</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>118</strong></td>
<td><strong>309</strong></td>
<td><strong>427</strong></td>
</tr>
</tbody>
</table>
APPENDIX C

Summary of 3-month Post-Deployment Follow-up Assessments

<table>
<thead>
<tr>
<th>Unit</th>
<th>PI Dropped(^1)</th>
<th>Subject Withdrew</th>
<th>Did Not Deploy(^2)</th>
<th>Unable to Contact (attempt average, range)</th>
<th>Follow-ups Completed In-person</th>
<th>Follow-ups Completed by Phone (attempt average, range)</th>
<th>Total Follow-ups Completed</th>
<th>Completion Rate(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-224(^{th})</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>34 (5.2, 1-9)</td>
<td>71</td>
<td>9 (4.4, 2-9)</td>
<td>80</td>
<td>69%</td>
</tr>
<tr>
<td>2-183(^{rd})</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>71 (4.7, 1-12)</td>
<td>211</td>
<td>17 (4.5, 1-9)</td>
<td>228</td>
<td>75%</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>5</td>
<td>8</td>
<td>105 (4.9, 1-12)</td>
<td>282</td>
<td>26 (4.5, 1-9)</td>
<td>308</td>
<td>74%</td>
</tr>
</tbody>
</table>

Total Pre-deployment Baseline Assessments Completed = 427 (2-224\(^{th}\) (Aviation) = 118, 2-183\(^{rd}\) (CAV) = 309)

1Withdrawn from the study, due to the fact that we have reason to believe that another individual completed the baseline assessment in his place

2No longer eligible for the study

3Completion Rate = Total follow-ups completed divided by eligible post-deployment assessments (# baselines completed – # PI dropped, # did not deploy)
APPENDIX D

Summary of 12-month Post-Deployment Follow-up Assessments

<table>
<thead>
<tr>
<th>Unit</th>
<th>PI Dropped&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Subject Withdraw</th>
<th>Did Not Deploy&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Unable to Contact (attempt average, range)</th>
<th>Follow-ups Completed In-person</th>
<th>Follow-ups Completed by Mail &amp; Phone (attempt average, range)</th>
<th>Total Follow-ups Completed</th>
<th>Completion Rate&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-224&lt;sup&gt;th&lt;/sup&gt;</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>41 (2.4, 0-4)</td>
<td>36</td>
<td>31 (2.0, 0-6)</td>
<td>67</td>
<td>59%</td>
</tr>
<tr>
<td>2-183&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>0</td>
<td>5</td>
<td>12</td>
<td>123 (2.4, 0-6)</td>
<td>129</td>
<td>40 (1.7, 0-5)</td>
<td>169</td>
<td>57%</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>11</td>
<td>15</td>
<td>164 (2.4, 0-6)</td>
<td>165</td>
<td>71 (1.9, 0-6)</td>
<td>236</td>
<td>57%</td>
</tr>
</tbody>
</table>

Total Pre-deployment Baseline Assessments Completed = 427 (2-224<sup>th</sup> (Aviation) = 118, 2-183<sup>rd</sup> (CAV) = 309)

Total early Post-deployment Assessments Completed = 308 (2-224<sup>th</sup> (Aviation) = 80, 2-183<sup>rd</sup> (CAV) = 228)

<sup>1</sup>Withdrawn from the study, due to the fact that we have reason to believe that another individual completed the baseline assessment in his place

<sup>2</sup>No longer eligible for the study

<sup>3</sup>Completion Rate = Total follow-ups completed divided by eligible post-deployment assessments (# baselines completed – # PI dropped (n=1), # did not deploy (n=15)
APPENDIX E

Personnel Receiving Pay from the Research Effort

Co-Investigators
• Joseph Constans, PhD
• Douglas Gibson, Psy. D., MPH
• Teresa Kramer, PhD
• Mark Wiederhold, MD, PhD

Programmers
• Silas Williams

Research Assistants
• Hilary Adams, BS
• Lauren Anthony, MPA
• Lauren Gay, BA
• Debbie Hodges
• Cliff Hudson, BA
• Susan Jegley, MSW
• Mitzi Mosier
• Kelly Peters, PhD
• Pat Savary, BS

Statisticians
• Xiaotong Han, MS
• Liya Lu, MS
• Jeff Pitcock, PhD

Other
• Valorie Shue, BA, Technical Writer
• Regina Stanley, BS, Project Coordinator
## APPENDIX F. Variable Codebook

### TABLE OF CONTENTS:

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
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<td>Cover Sheet / Miscellaneous</td>
<td>2-3</td>
</tr>
<tr>
<td>Demographics (including Medications)</td>
<td>4-8</td>
</tr>
<tr>
<td>Military History</td>
<td>9-10</td>
</tr>
<tr>
<td>Deployment History</td>
<td>11-12</td>
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<tr>
<td>PTSD Checklist – Military Version (PCL-M)</td>
<td>13-14</td>
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<tr>
<td>BSI</td>
<td>15-16</td>
</tr>
<tr>
<td>CD-RISC</td>
<td>17-18</td>
</tr>
<tr>
<td>PTCI</td>
<td>19-20</td>
</tr>
<tr>
<td>PHQ-9</td>
<td>21</td>
</tr>
<tr>
<td>Mental Health Treatment</td>
<td>22-23</td>
</tr>
<tr>
<td>TBI (Traumatic Brain Injury)</td>
<td>24-26</td>
</tr>
<tr>
<td>Pittsburgh Sleep Quality Index</td>
<td>27-30</td>
</tr>
<tr>
<td>Sheehan Disability Scale</td>
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<td>SSRPH</td>
<td>32</td>
</tr>
<tr>
<td>Pre-Deployment Life Events</td>
<td>33-34</td>
</tr>
<tr>
<td>Combat Experiences</td>
<td>35-36</td>
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<td>Audit C</td>
<td>37</td>
</tr>
<tr>
<td>Pain Questionnaire</td>
<td>38</td>
</tr>
<tr>
<td>SF-12</td>
<td>39-41</td>
</tr>
<tr>
<td>Unit Cohesion</td>
<td>42-43</td>
</tr>
</tbody>
</table>
ID          Participant Identification Number

STUDYARM    Randomized Study Arm

  1 = Cognitive Bias
  2 = Biofeedback
  3 = Control

UNIT        Assigned Unit

  1 = Aviation
  2 = CAV

COMPANY     Company/Platoon/Troop/Battalion

  1 = Alpha
  2 = Bravo
  3 = Delta
  4 = Echo
  5 = HHC
  6 = Troop A, HQ
  7 = Troop A, 1st Platoon
  8 = Troop A, 2nd Platoon
  9 = Troop B, HQ
  10 = Troop B, 1st Platoon
  11 = Troop B, 2nd Platoon
  12 = Comp A BSTB, HQ
  13 = Comp A BSTB, 1st Platoon
  14 = Comp A BSTB, 2nd Platoon
<table>
<thead>
<tr>
<th>Number</th>
<th>Unit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Comp C-116, HQ</td>
</tr>
<tr>
<td>16</td>
<td>Comp C-116, 1st Platoon</td>
</tr>
<tr>
<td>17</td>
<td>Comp C-116, 2nd Platoon</td>
</tr>
<tr>
<td>18</td>
<td>Troop C, HQ</td>
</tr>
<tr>
<td>19</td>
<td>Troop C, 1st Platoon</td>
</tr>
<tr>
<td>20</td>
<td>Troop C, 2nd Platoon</td>
</tr>
<tr>
<td>21</td>
<td>Troop C, 3rd Platoon</td>
</tr>
<tr>
<td>22</td>
<td>Troop C, 4th Platoon</td>
</tr>
<tr>
<td>23</td>
<td>Company D-3-116, HQ</td>
</tr>
<tr>
<td>24</td>
<td>Company D-3-116, 1st Platoon</td>
</tr>
<tr>
<td>25</td>
<td>Company D-3-116, 2nd Platoon</td>
</tr>
<tr>
<td>26</td>
<td>Company D-3-116, 3rd Platoon</td>
</tr>
<tr>
<td>27</td>
<td>Company D-3-116, 4th Platoon</td>
</tr>
<tr>
<td>28</td>
<td>Company D-3-116, 5th Platoon</td>
</tr>
<tr>
<td>29</td>
<td>Company D-3-116, 6th Platoon</td>
</tr>
<tr>
<td>30</td>
<td>HQ (Entire Battalion)</td>
</tr>
</tbody>
</table>

**DEPLOYED**

To the best of our knowledge, did soldier deploy between Baseline and First Follow-up?

- 0 = Not deployed
- 1 = Deployed

**WITHDREW**

Participant withdrew from study

- 0 = No
- 1 = Yes
DROPPED  Participant was dropped from study

    0 = No

    1 = Yes

Date of Assessment

BLDATE  Baseline
F1DATE  First Post-Deployment
F2DATE  Final Post-Deployment

NOTE: The following codes were used consistently through the coding process unless otherwise specified:

    77 = Not applicable

    88 = Missing

    99 = Refused

Interview Mode (post-deployment assessments only)

F1LOCATION  First Post-Deployment
F2LOCATION  Final Post-Deployment

    1 = In Person

    2 = Phone

    3 = Mail (1-year post deployment assessment only)
**Demographics**

What is your age?

<table>
<thead>
<tr>
<th>AGE</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1AGE</td>
<td>First Post-Deployment</td>
</tr>
<tr>
<td>F2AGE</td>
<td>Final Post-Deployment</td>
</tr>
</tbody>
</table>

What is your gender?

1 = Male
2 = Female

Which of the following best describes your racial background?

1 = American Indian or Alaskan Native
2 = Asian/Oriental or Pacific Islander
3 = Black/African American
4 = White/Caucasian, not of Hispanic origin
5 = Hispanic
6 = Other

If RACE=6, OTHER specified (Text field)

Which of the following best describes your current marital status?

<table>
<thead>
<tr>
<th>MARITAL</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1MARITAL</td>
<td>First Post-Deployment</td>
</tr>
<tr>
<td>F2MARITAL</td>
<td>Final Post-Deployment</td>
</tr>
</tbody>
</table>

1 = Married/Cohabitating
2 = Widowed
3 = Separated
4 = Divorced
5 = Never Married
What is the highest grade you completed in school?

EDUC  Baseline
F1EDUC  First Post-Deployment
F2EDUC  Final Post-Deployment

1 = 8th grade or less
2 = Some high school
3 = GED
4 = High school graduate
5 = Some college/technical school
6 = College graduate
7 = Any post-graduate work
8 = Graduate degree (masters or doctorate)

What is your employment status?

EMPLOY  Baseline
F1EMPLOY  First Post-Deployment
F2EMPLOY  Final Post-Deployment

1 = Employed full-time (35 + hours per week)
2 = Employed part time (less than 35 hours per week)
3 = Unemployed, looking for work
4 = Unemployed, disabled
5 = Unemployed, volunteer work
6 = Unemployed, retired
7 = Unemployed, not looking for work
8 = Other
If EMPLOY=8, OTHER specified (text field)

<table>
<thead>
<tr>
<th>EMPOTH</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1EMPOTH</td>
<td>First Post-Deployment</td>
</tr>
<tr>
<td>F2EMPOTH</td>
<td>Final Post-Deployment</td>
</tr>
</tbody>
</table>
Which of the following categories best describes your household’s total income before taxes last year? Please include income from all sources such as salaries and wages, Social Security, retirement income, investments and other sources.

**INCOME**
- **Baseline**
- **F1INCOME** First Post-Deployment
- **F2INCOME** Final Post-Deployment
  - 1 = Less than $20,000
  - 2 = $20,000 - $39,999
  - 3 = $40,000 - $59,999
  - 4 = $60,000 - $79,999
  - 5 = $80,000 or more

Has a medical professional told you that you have moderate to severe hearing loss in the past year?

**HEARLOSS**
- **Baseline**
- **F1HEARLOSS** First Post-Deployment Assessment
- **F2HEARLOSS** Final Post-Deployment Assessment
  - 0 = No
  - 1 = Yes

Do you currently use tobacco products?

**TOBACCO**
- **Baseline**
- **F1TOBACCO** First Post-Deployment
- **F2TOBACCO** Final Post-Deployment
  - 0 = No
  - 1 = Yes
If TOBACCO = 1, continue

If YES, what type of tobacco product do you use?

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOBTYPE</td>
<td>Baseline</td>
</tr>
<tr>
<td>F1TOBTYPE</td>
<td>First Post-Deployment</td>
</tr>
<tr>
<td>F2TOBTYPE</td>
<td>Final Post-Deployment</td>
</tr>
<tr>
<td>1</td>
<td>Cigarettes</td>
</tr>
<tr>
<td>2</td>
<td>Chewing (smokeless)</td>
</tr>
<tr>
<td>3</td>
<td>Both</td>
</tr>
<tr>
<td>4</td>
<td>Other</td>
</tr>
</tbody>
</table>
If TOBTYPE = 4, OTHER specified (text field)

TOBTYPEOTH Baseline
F1TOBTYPEOTH First Post-Deployment
F2TOBTYPEOTH Final Post-Deployment

If TOBTYPE = 1 or 3, ask CIGPACKS AND CI GLAST

If you use cigarettes, which of the following best describes how many packs you typically smoke per day?

CIGPACKS Baseline
F1CIGPACS First Post-Deployment
F2CIGPACS Final Post-Deployment

1 = Less than half a pack
2 = Half a pack
3 = One pack
4 = Two packs
5 = More than two packs

When was your last cigarette?

CI GLAST Baseline
F1CI GLAST First Post-Deployment
F2CI GLAST Final Post-Deployment

1 = Less than 30 minutes ago
2 = 30-60 minutes ago
3 = 1-2 hours ago
4 = More than 2 hours ago
If TOBTYPE = 2 or 3 ask TOBCANS and TOBLAST

If you use chewing tobacco, which of the following best describes how many cans you typically use per week?

TOBCANS Baseline
F1TOBCANS First Post-Deployment
F2TOBCANS Final Post-Deployment

1 = Less than one can
2 = One can
3 = Two cans
4 = Three cans
5 = Four or more cans

When was your last dip?

TOBLAST Baseline
F1TOBLAST First Post-Deployment
F2TOBLAST Final Post-Deployment

1 = Have dip in now
2 = Less than 30 minutes ago
3 = 30-60 minutes ago
4 = 1-2 hours ago
5 = More than 2 hours ago

HANDEDNESS Right or left handed

1 = Right handed
2 = Left handed

**Medications:**

NOTE: In the field name, the _1 changes to the next consecutive number for each medication. Total possible – 5 at Baseline; 4 at 1st follow-up; 11 at final follow-up

**Medication mode**

MEDTYPE_1 Baseline
F1MEDTYPE_1 First Post-Deployment
F2MEDTYPE_1 Final Post-Deployment

1 = Every day
2 = As needed

**Medication Name (text field)**

MEDNAME_1 Baseline
F1MEDNAME_1 First Post-Deployment
F2MEDNAME_1 Final Post-Deployment

**Last date taken (date field)**

MEDLAST_1 Baseline
F1MEDLAST_1 First Post-Deployment
F2MEDLAST_1 Final Post-Deployment

**Last time taken (text field)**

MEDTIME_1 Baseline
F1MEDTIME_1 First Post-Deployment
MILITARY HISTORY

1. Which of the following best describes your current military status?

MILSTATUS Baseline NOTE: Not asked of Aviation Unit
F1MILSTATUS First Post-Deployment NOTE: Not asked of Aviation Unit
F2MILSTATUS Final Post-Deployment

1 = Active duty
2 = Reserve
3 = National Guard
4 = Retired
5 = Honorable discharge (not retired)
6 = Other than honorable discharge
7 = Other

If MILSTATUS = 7, specify other (text field)

MILSTATUSOTH Baseline NOTE: Not asked of Aviation Unit
F1MILSTATUSOTH First Post-Deployment NOTE: Not asked of Aviation Unit
F2MILSTATUSOTH Final Post-Deployment

2. Which branch of military service are you in or were you in?

MILBRANCH1 – MILBRANCH5 are coded as follows:

NOTE: Not collected at either post-deployment assessment

0 = No
1 = Yes
MILBRANCH1  Army
MILBRANCH2  Navy
MILBRANCH3  Air Force
MILBRANCH4  Marines
MILBRANCH5  Coast Guard
3. What is your current military rank (if retired or discharged, enter you rank at the time you retired or were discharged)

**NOTE:** Since this information was not collected from the Aviation Unit at Baseline, this field was extracted from the first post-deployment data if collected. If the first post-deployment data was not collected but the final post-deployment data was collected, then this field was extracted from the final post-deployment data.

1 = E1-E3
2 = E4-E6
3 = E7-E9
4 = Warrant Officer
5 = O1-O3
6 = O4-O6
7 = O7 and above

4. How many total active and reserve years of military service have you completed?

**NOTE:** Since this information was not collected from the Aviation Unit at Baseline, this field was extracted from the first post-deployment data if collected. If the first post-deployment data was not collected but the final post-deployment data was collected, then this field was extracted from the final post-deployment data.

Number entered or 88 for Missing

**DO NOT USE THE DEPLOYNUM VARIABLE!!**

5. What is the total number of your overseas military deployments? (as reported by participant)

Number entered or 88 for Missing
**Deployment History:**

NOTE: In the field name, the _1 changes to the next consecutive number for each deployment. Total possible – 9

DEPLOYLOCATION_1 Where were you deployed (Location)? (text field)

DEPLOYMONTHS_1 Duration of deployment in months

COMBATEXPOSURE_1 Combat Exposure

\[
\begin{align*}
0 &= \text{No} \\
1 &= \text{Yes} \\
88 &= \text{Missing}
\end{align*}
\]

CASUALTIES_1 Number of casualties in your unit

Number entered or

\[
\begin{align*}
88 &= \text{Missing} \\
99 &= \text{Refused}
\end{align*}
\]

TOTALDEPLOY Total number of deployments (calculated by deployments listed)

\[
88 = \text{Missing}
\]

TOTALDEPLOYMTHS Total number of months deployed (calculated by adding participants account of deployment months)

TOTCOMBATEXP Total number of combat exposure (calculated by adding deployments with combat exposure reported by participant at baseline) - CAV only – AVI all coded as missing.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREVCOMBATEXP</td>
<td>Previous deployment to combat zone prior to baseline (obtained for both units from first follow-up variable F1CEB (Have you been deployed to a combat zone prior to your most recent deployment?)&lt;br&gt;0 = No&lt;br&gt;1 = Yes</td>
</tr>
<tr>
<td>BLDEPLOY</td>
<td>Total number of deployments reported at Baseline&lt;br&gt;The Aviation Unit was not asked this at Baseline so number given is one reported at F1 Follow-Up -1. If the F1 follow-up data has not been collected, the value is 88.</td>
</tr>
<tr>
<td>F1DEPLOY</td>
<td>Total number of deployments reported between Baseline and F1 Follow-up data collection. If Follow-up has not been collected yet, the value is 88.</td>
</tr>
<tr>
<td>TOTALCASUALTIES</td>
<td>Total number of casualties reported by participant for all deployments. If no deployment data has been collected on participant, this field is coded as 88.</td>
</tr>
<tr>
<td>HOSTDEPL</td>
<td>Did participant have any Hostile Fire Deployments?&lt;br&gt;-1 = No previous deployments&lt;br&gt;0 = No&lt;br&gt;1 = Yes&lt;br&gt;Blank = Missing deployment information</td>
</tr>
</tbody>
</table>
PTSD Checklist – Military Version (PCL-M)

Below is a list of problems and complaints that veterans sometimes have in response to stressful life experiences. Indicate how much you have been bothered by that problem in the last month.

Instrument Administered:

Baseline - Field names are as below

First Post-Deployment - Add “F1” as prefix to Baseline field names

Final Post-Deployment - Add “F2” as prefix to Baseline field names

PCLM1 – PCLM17 coded as follows:

1 = Not at all
2 = A little bit
3 = Moderately
4 = Quite a bit
5 = Extremely

PCLM1 1. Repeated, disturbing memories, thoughts, or images of a stressful military experience from the past.

PCLM2 2. Repeated, disturbing dreams of a stressful military experience from the past.

PCLM3 3. Suddenly acting or feeling as if a stressful military experience were happening again (as if you were reliving it)?
<table>
<thead>
<tr>
<th>PCLM4</th>
<th>4. Feeling very upset when something reminded you of a stressful military experience?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCLM5</td>
<td>5. Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful military experience?</td>
</tr>
<tr>
<td>PCLM6</td>
<td>6. Avoid thinking about or talking about a stressful military experience or avoid having feelings related to it?</td>
</tr>
<tr>
<td>PCLM7</td>
<td>7. Avoid activities or situations because they remind you of a stressful military experience?</td>
</tr>
<tr>
<td>PCLM8</td>
<td>8. Trouble remembering important parts of a stressful military experience?</td>
</tr>
<tr>
<td>PCLM9</td>
<td>9. Loss of interest in things that you used to enjoy?</td>
</tr>
<tr>
<td>PCLM10</td>
<td>10. Feeling distant or cut off from other people?</td>
</tr>
<tr>
<td>PCLM11</td>
<td>11. Feeling emotionally numb or being unable to have loving feelings for those close to you?</td>
</tr>
<tr>
<td>PCLM12</td>
<td>12. Feeling as if your future will somehow be cut short?</td>
</tr>
<tr>
<td>PCLM13</td>
<td>13. Trouble falling or staying asleep?</td>
</tr>
<tr>
<td>PCLM14</td>
<td>14. Feeling irritable or having angry outbursts?</td>
</tr>
</tbody>
</table>
15. Having difficulty concentrating?

16. Being “super alert” or watchful on guard?

17. Feeling jumpy or easily startled?

Scoring:

PCLM_C1  Cluster 1 Score (# of Items 1-5 >= 3) - Reexperiencing
          0 = Did not meet criteria
          1 = Met criteria of 1 or more items

PCLM_C2  Cluster 2 Score (Items 6-12 >=3) Avoidance/Numbing
          0 = Did not meet criteria
          1 = Met criteria of 3 or more items

PCLM_C3  Cluster 3 Score (Items 13-17 >=3) Hyperarousal
          0 = Did not meet criteria
          1 = Met criteria of 2 or more items

PCLSCR   PCLM Score (sum of all)
BSI

Read each of the following items carefully, then indicate how much that problem distressed or bothered you during the past 30 days including today.

Instrument Administered:

Baseline - Field names are as below

First Post-Deployment - Add “F1” as prefix to Baseline field names

Final Post-Deployment - Add “F2” as prefix to Baseline field names

BSI 1 - BSI 23 are coded as follows:

1 = Not at all
2 = A little bit
3 = Moderately
4 = Quite a bit
5 = Extremely

BSI 1  1. Faintness or dizziness
BSI 2  2. Feeling no interest in things
BSI 3  3. Nervousness and shakiness inside
BSI 4  4. Feeling easily annoyed or irritated
BSI 5  5. Pains in heart or chest
BSI 6  6. Feeling lonely
BSI 7  7. Feeling tense or keyed up
BSI 8  8. Nausea or upset stomach
BSI 9  9.  Feeling blue
BSI 10  10.  Temper outbursts that you could not control
BSI 11  11.  Suddenly scared for no reason
BSI 12  12.  Trouble getting your breath
BSI 13  13.  Feelings of worthlessness
BSI 14  14.  Spells or terror or panic
BSI 15  15.  Numbness or tingling in parts of your body
BSI 16  16.  Feeling hopelessness about the future
BSI 17  17.  Having urges to beat, injure, or harm someone
BSI 18  18.  Having urges to break or smash things
BSI 19  19.  Feeling so restless you couldn’t sit still
BSI 20  20.  Feeling weak in parts of your body
BSI 21  21.  Thoughts of ending your life
BSI 22  22.  Getting into frequent arguments
BSI 23  23.  Feeling fearful

Scoring:

I could not find scoring specifically for the 23-item BSI so I used the subscale scoring for the larger 53-item BSI. The 4 subscales below matched exactly with the larger item BSI, however, the Somatization subscale was lacking 1 item.

BSI_SOM  Somatization Subscale score (sum of items 1, 5, 8, 12, 15, and 20)

BSI_HOS  Hostility Subscale score (sum of items 4, 10, 17, 18, and 22)

BSI_DEP  Depression Subscale score (sum of items 2, 6, 9, 13, 16, and 21)
BSI_ANX  Anxiety Subscale score (sum of items 3, 7, 11, 14, 19, and 23)

BSI_TOTSCR  Sum of all items
CD-RISC

Please indicate how much you agree with the following statements as they apply to you over the past month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

Instrument Administered:

Baseline - Field names are as below

First Post-Deployment - Add “F1” as prefix to Baseline field names

Final Post-Deployment - Add “F2” as prefix to Baseline field names

RISC1 - RISC25 are coded as follows:

0 = Not at all true
1 = Rarely true
2 = Sometimes
3 = Often true
4 = Nearly always

RISC1  I am able to adapt when changes occur.
RISC2  I have at least one close and secure relationship which helps me when I am stressed.
RISC3  When there are no clear solutions to my problems, sometimes fate or God can help.
RISC4  I can deal with whatever comes my way.
RISC5  Past successes give me confidence in dealing with new challenges and difficulties.
RISC6  I try to see the humorous side of things when I am faced with problems.
RISC7  Having to cope with stress can make me stronger.
RISC8  I tend to bounce back after illness, injury, or other hardships.
RISC9  Good or bad, I believe that most things happen for a reason.
RISC10 I give my best effort, no matter what the outcomes may be.
RISC11 I believe I can achieve my goals, even if there are obstacles.
RISC12 Even when things look hopeless, I don't give up.
RISC13 During times of stress/crisis, I know where to turn for help.
RISC14 Under pressure, I stay focused and think clearly.
RISC15 I prefer to take the lead in solving problems, rather than letting others make all the decisions.
RISC16 I am not discouraged by failure.
RISC17 I think of myself as a strong person when dealing with life's challenges and difficulties.
RISC18 I can make unpopular or difficult decisions that affect other people if it is necessary.
RISC19 I am able to handle unpleasant or painful feelings like sadness, fear, and anger.
RISC20 In dealing with life's problems, sometimes you have to act on a hunch, without knowing why.
RISC21 I have a strong sense of purpose in life.
RISC22 I feel in control of my life.
RISC23 I like challenges.
RISC24 I work to obtain my goals, no matter what roadblocks I encounter along the way.
RISC25 I take pride in my achievements.
Scoring:

RISCSCR       Sum of all items
We are interested in the kind of thoughts you may have had after a distressing experience. Below are a number of statements that may or may not be representative of your thinking. Please think of a recent distressing event. Please read each statement carefully and tell us how much you AGREE or DISAGREE with each statement in relation to that event.

**Instrument Administered:**

**Baseline** - Field names are as below

**First Post-Deployment** - Add “F1” as prefix to Baseline field names

**Final Post-Deployment** - Add “F2” as prefix to Baseline field names

PTCI1 – PTCI36 are coded as follows:

1 = Totally disagree
2 = Disagree very much
3 = Disagree slightly
4 = Neutral
5 = Agree slightly
6 = Agree very much
7 = Totally agree

PTCI1  1. The event happened because of the way I acted.
PTCI2  2. I can't trust that I will do the right thing.
PTCI3  3. I am a weak person.
PTCI4  4. I will not be able to control my anger and will do something terrible.
PTCI5  5. I can't deal with even the slightest upset.
PTCI6  6. I used to be a happy person but now I am always miserable.
PTCI7  7. People can't be trusted.
PTCI8  8. I have to be on guard all of the time.
PTCI9  9. I feel dead inside.
PTCI10  10. You can never know who will harm you.
PTCI11  11. I have to be especially careful because you never know what can happen next.
PTCI12  12. I am inadequate.
PTCI13  13. I will not be able to control my emotions, and something terrible will happen.
PTCI14  14. If I think about the event, I will not be able to handle it.
PTCI15  15. The event happened to me because of the sort of person I am.
PTCI16  16. My reactions since the event mean that I am going crazy.
PTCI17  17. I will never be able to feel normal emotions again.
PTCI18  18. The world is a dangerous place.
PTCI19  19. Somebody else would have stopped the event from happening.
PTCI20  20. I have permanently changed for the worse.
PTCI21  21. I feel like an object, not like a person.
PTCI22  22. Somebody else would not have gotten into this situation.
PTCI23  23. I can't rely on other people.
PTCI24  24. I feel isolated and set apart from others.
PTCI25  25. I have no future.
PTCI26  26. I can't stop bad things from happening to me.
PTCI27  27. People are not what they seem.
PTCI28 28. My life has been destroyed by the trauma.
PTCI29 29. There is something wrong with me as a person.
PTCI30 30. My reactions since the event show that I am a lousy coper.
PTCI31 31. There is something about me that made the event happen.
PTCI32 32. I will not be able to tolerate my thoughts about the event, and I will fall apart.
PTCI33 33. I feel like I don’t know myself anymore.
PTCI34 34. You never know when something terrible will happen.
PTCI35 35. I can’t rely on myself.
PTCI36 36. Nothing good can happen to me anymore.

Scoring:

PTCI SELF  Negative Cognitions about the Self
(Sum of Items 2, 3, 4, 5, 6, 9, 12, 14, 16, 17, 20, 21, 24, 25, 26, 28, 29, 30, 33, 35, and 36) divided by 21

PTCI WORLD  Negative Cognitions about the World
(Sum of Items 7, 8, 10, 11, 18, 23, and 27) divided by 7

PTCI BLAME  Self-Blame
(Sum of Items 1, 15, 19, 22, and 31) divided by 5

PTCI SCR  Total Score (sum of PTCI SELF, PTCI WORLD, and PTCI BLAME)

**NOTE:** Items 13, 32, and 34 are not scored
**PHQ-9**

**Instrument Administered:**

**Baseline - Field names are as below**

**First Post-Deployment - Add “F1” as prefix to Baseline field names**

**Final Post-Deployment - Add “F2” as prefix to Baseline field names**

Over the last 2 weeks, how often have you been bothered by any of the following problems?

PHQ1 – PHQ9 are coded as follows:

0 = Not at all
1 = Several days
2 = More than half the days
3 = Nearly every day

PHQ1 1. Little interest or pleasure in doing things?
PHQ2 2. Feeling down, depressed, or hopeless?
PHQ3 3. Trouble falling or staying asleep, or sleeping too much?
PHQ4 4. Feeling tired or having little energy?
PHQ5 5. Poor appetite or overeating?
PHQ6 6. Feeling bad about yourself - or that you were a failure or have let yourself or your family down?
PHQ7 7. Trouble concentrating on things, such as reading the newspaper or watching television?
PHQ8 8. Moving or speaking so slowly that other people have noticed? Or the opposite-being so fidgety or restless that you have been moving around a lot more than usual?
PHQ9 9. Thoughts that you would be better off dead or of hurting yourself in some way?

PHQ10 10. PHQ Total Score

PHQ11 11. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?
Current Mental Health Treatment Questions

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change “F1” prefix for field names to “F2”

F1MHTX1  1. Are you currently receiving treatment for any mental health problem?

   1 = Yes
   2 = No

If F1MHTX1 = No, F1MHTX2 and F1MHTX3A-F1MHTX3F should be coded as 1 (No Treatment)

F1MHTX2  2. What type of mental health treatment are you receiving?

   1 = No treatment
   2 = Antidepressant medication
   3 = Counseling
   4 = both medication and counseling
   5 = Other

F1MHTX2OTH If F1MHTX2 = 5, specify other (text field)

F1MHTX3A-F1MHTX3F are coded as follows:

   0 = No
F1MHTX3A  No treatment
F1MHTX3B  Primary care doctor
F1MHTX3C  Psychiatrist
F1MHTX3D  Psychologist
F1MHTX3E  Social Worker
F1MHTX3F  Other counselor

F1MHTX3OTH  If F1MHTX3F=1, specify other (text field)

Past Mental Health Treatment Questions (do not include current episode)

F1MHTX4  4. Have you ever been treated for a previous mental health problem?

1 = Yes

2 = No

If F1MHTX4 = No, F1MHTX5 and F1MHTX6A-F1MHTX6F should be coded 1 (no treatment)

F1MHTX5  5. What type of mental health treatment did you receive in the past (include all past treatments if multiple past episodes)?

1 = No treatment

2 = Antidepressant medication

3 = Counseling

4 = both medication and counseling
5 = Other

F1MHTX5OTH  If F1MHTX5 = 5, specify other (text field)

6. Who provided your mental health treatment in the past (include all past providers if multiple past episodes)?

F1MHTX6A-F1MHTX6F are coded as follows:

0 = No
1 = Yes

F1MHTX6A  No treatment
F1MHTX6B  Primary care doctor
F1MHTX6C  Psychiatrist
F1MHTX6D  Psychologist
F1MHTX6E  Social Worker
F1MHTX6F  Other counselor

F1MHTX6OTH  If F1MHTX6F = 1, specify other (text field)

F1MHTX7  7. Have you ever been hospitalized for mental health problems?

1 = Yes
2 = No
TBI

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change “F1” prefix for field names to “F2”

F1TBI1 1. Were you exposed to a blast(s) during your most recent deployment?
    0 = No
    1 = Yes

2. Did you have any injury(ies) during your most recent deployment from any of the following?

F1TBI2A- F1TBI2F are coded as follows:
    0 = No
    1 = Yes

F1TBI2A  Fragment
F1TBI2B  Blast (improvised Explosive Device, PPG, Land mine, Grenade, etc.)
F1TBI2C  Bullet
F1TBI2D  Vehicular (any type of vehicle, including airplane)
F1TBI2E  Fall
F1TBI2F  Other

F1TBI2FOTH  If F1TBI2F=1 (Yes), specify (text field)

3. Did any injury received during your most recent deployment result in any of the following?
F1TBI3A- F1TBI3H are coded as follows:

0 = No
1 = Yes

F1TBI3A Being dazed, confused or “seeing stars”
F1TBI3B Not remembering the injury
F1TBI3C Losing consciousness (knocked out) less than one minute
F1TBI3D Losing consciousness (knocked out) 1-20 minutes
F1TBI3E Losing consciousness (knocked out) longer than 20 minutes
F1TBI3F Having any symptoms of concussion afterward (headache, dizziness, irritability)
F1TBI3G Head injury
F1TBI3H None of the above
4. Are you currently experiencing any of the following problems?

F1TBI4A-F1TBI4H are coded as follows:

0 = No  
1 = Yes

F1TBI4A  Frequent headaches  
F1TBI4B  Dizziness  
F1TBI4C  Memory problems  
F1TBI4D  Balance problems  
F1TBI4E  Ringing in ears  
F1TBI4F  Irritability  
F1TBI4G  Sleep problems  
F1TBI4H  Other

F1TBI4HOTH  If F1TBI4H=1 (Yes), specify (text field)

5. Have you deployed to a combat zone prior to this most recent deployment?

0 = No  
1 = Yes

If F1TBI5=1 (YES), continue. Otherwise, skip to PTCI Section

6. Were you exposed to a blast(s) during any deployment prior to your most recent deployment?

0 = No  
1 = Yes
7. Did you have any injury(ies) during any deployment prior to your most recent deployment from any of the following?

F1TBI7A- F1TBI7F are coded as follows:

0 = No
1 = Yes

F1TBI7A  Fragment
F1TBI7B  Blast (improvised Explosive Device, PPG, Land mine, Grenade, etc.)
F1TBI7C  Bullet
F1TBI7D  Vehicular (any type of vehicle, including airplane)
F1TBI7E  Fall
F1TBI7F  Other

F1TBI7FOTH  If F1TBI7F=1 (Yes), specify (text field)
8. Did any injury received during any deployment prior to your most recent deployment result in any of the following?

F1TBI8A- F1TBI8H are coded as follows:

\[
\begin{align*}
0 &= \text{No} \\
1 &= \text{Yes}
\end{align*}
\]

F1TBI8A  Being dazed, confused or “seeing stars”
F1TBI8B  Not remembering the injury
F1TBI8C  Losing consciousness (knocked out) less than one minute
F1TBI8D  Losing consciousness (knocked out) 1-20 minutes
F1TBI8E  Losing consciousness (knocked out) longer than 20 minutes
F1TBI8F  Having any symptoms of concussion afterward (headache, dizziness, irritability)
F1TBI8G  Head injury
F1TBI8H  None of the above
PITTSBURG SLEEP QUALITY INDEX

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change “F1” prefix for field names to “F2”

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month.

F1PSQI1 1. During the past month, what time have you usually gone to bed at night?
   Time entered

F1PSQI2 2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?
   Minutes entered or
   888 = Don’t know
   999 = Refused

F1PSQI3 3. During the past month, what time have you usually gotten up in the morning?
   Time entered

F1PSQI4 4. During the past month, how many hours of actual sleep did you get at night?
   (This may be different than the number of hours you spent in bed).
   Hours entered
   888 = Don’t know
999 = Refused

F1PSQIDIFF Difference (in hours) between going to bed and getting up

F1PSQI5A 5a. During the past month, how often have you had trouble sleeping because you cannot get to sleep within 30 minutes.

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week
5b. During the past month, how often have you had trouble sleeping because you wake up in the middle of the night or early morning.

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

5c. During the past month, how often have you had trouble sleeping because you have to get up to use the bathroom.

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

5d. During the past month, how often have you had trouble sleeping because you cannot breathe comfortably.

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

5e. During the past month, how often have you had trouble sleeping because you cough or snore loudly.

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week
5f. During the past month, how often have you had trouble sleeping because you feel too cold.

0 = Not during the past month  
1 = Less than once a week  
2 = Once or twice a week  
3 = Three or more times a week

5g. During the past month, how often have you had trouble sleeping because you feel too hot.

0 = Not during the past month  
1 = Less than once a week  
2 = Once or twice a week  
3 = Three or more times a week
F1PSQ15H  5h. During the past month, how often have you had trouble sleeping because you had bad dreams.

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

F1PSQ15I  5i. During the past month, how often have you had trouble sleeping because you have pain.

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

F1PSQ15OATH  Other reasons, please describe (text field)

If other reason(s) given...

F1PSQ15J  5j. During the past month, how often have you had trouble sleeping because of this?

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

F1PSQ16  6. During the past month, how would you rate your sleep quality overall?

1 = Very good
2 = Fairly good

69
3 = Fairly bad
4 = Very bad

F1PSQI7  7. During the past month, how often have you taken medicine to help you sleep (prescribed or over the counter)?

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

F1PSQI8  8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activities?

0 = Not during the past month
1 = Less than once a week
2 = Once or twice a week
3 = Three or more times a week

F1PSQI9  9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

0 = No problem at all
1 = Only a very slight problem
2 = Somewhat of a problem
3 = A very big problem

F1PSQIDURAT  Duration of Sleep

Minimum Score = 0 (better)
Maximum Score = 3 (worse)
F1PSQIDISTB  Sleep Disturbance
  Minimum Score = 0 (better)
  Maximum Score = 3 (worse)

F1PSQILATEN  Sleep Latency
  Minimum Score = 0 (better)
  Maximum Score = 3 (worse)

F1PSQIDAYDYS  Day Dysfunction Due to Sleepiness
  Minimum Score = 0 (better)
  Maximum Score = 3 (worse)

F1PSQIHSE  Sleep Efficiency
  Minimum Score = 0 (better)
  Maximum Score = 3 (worse)

F1PSQISLPQUAL  Overall Sleep Quality
  Minimum Score = 0 (better)
  Maximum Score = 3 (worse)

F1PSQIMEDS  Needs Meds to sleep
  Minimum Score = 0 (better)
  Maximum Score = 3 (worse)

F1PSQI  Total Score (All Subscores summed)
Minimum Score = 0 (better)

Maximum Score = 21 (worse)

Interpretation: TOTAL <= 5 associated with good sleep quality

TOTAL > 5 associated with poor sleep quality
SHEEHAN DISABILITY SCALE

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change “F1” prefix for field names to “F2”

F1SDS1 – F1SDS3 are coded as follows:

0 = Not at all
1 = Mildly
2 = Mildly
3 = Mildly
4 = Moderately
5 = Moderately
6 = Moderately
7 = Markedly
8 = Markedly
9 = Markedly
10 = Extremely
11 = N/A (for Question F1SDS1 only)

F1SDS1 1. To what extent have emotional symptoms disrupted your work in the last month?

F1SDS2 2. To what extent have emotional symptoms disrupted your social life in the last month?
3. To what extent have emotional symptoms disrupted your family life/home responsibilities in the last month?
SSRPH

Instrument Administered:
First Post-Deployment - Field names are as below
Final Post-Deployment - Change “F1” prefix for field names to “F2”

Please read each statement carefully and circle the answer to indicate how much you agree or disagree with each item.

F1SSRPH1 – F1SSRPH5 are coded as follows:

0 = Strongly disagree
1 = Disagree
2 = Agree
3 = Strongly agree

F1SSRPH1 1. Receiving mental health treatment for emotional or interpersonal problems carries social stigma.

F1SSRPH2 2. It is a sign of personal weakness or inadequacy to receive mental health treatment for emotional or interpersonal problems.

F1SSRPH3 3. People will see a person in a less favorable way if they come to know that he/she had received mental health treatment.

F1SSRPH4 4. It is advisable for a person to hide from people that he/she had received mental health treatment.
5. People tend to like less those who are receiving professional mental health treatment.
**PRE-DEPLOYMENT LIFE EVENTS**

**Instrument Administered:**

**First Post-Deployment - Field names are as below**

The statements below refer to events you may have experienced BEFORE YOUR MOST RECENT DEPLOYMENT. No one has had exactly the same experiences that you have had, so your input is important. There are no right or wrong answers. Please indicate YES or NO for each item below.

F1PRDEPLE1 – F1PRDEPLE14 and F1PRDEPLE15 are coded as follows:

<table>
<thead>
<tr>
<th>0 = No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Yes</td>
</tr>
</tbody>
</table>

Before I was deployed, I experienced...

F1PDLE1 1. a natural disaster (for example, a flood or hurricane), a fire, or an accident in which I was hurt or my property was damaged.

F1PDLE2 2. exposure to a toxic substance (such as dangerous chemicals, radiation)

F1PDLE3 3. combat or exposure to a war zone (in the military or as a civilian)

F1PDLE4 4. a mental illness (for example, clinical depression, anxiety disorder), or life-threatening physical illness (for example, cancer or heart disease) of someone close to me.

F1PDLE5 5. a parent who had a problem with drugs or alcohol

F1PDLE6 6. the death of someone close to me.

Before I was deployed, I had...

F1PDLE7 7. been through a divorce or been left by a partner or significant other

F1PDLE8 8. witnessed someone being assaulted or violently killed

F1PDLE9 9. been robbed or had my home broken into

F1PDLE10 10. lost my job
F1PDLE11  11. been emotionally mistreated (for example, shamed, embarrassed, ignored, or repeatedly told I was no good)

F1PDLE12  12. seen or heard physical fighting between my parents or caregivers

F1PDLE13  13. been physically punished by a parent or caregivers

F1PDLE14  14. been physically injured by another person (for example, hit, kicked, beaten up)

F1PDLE14A  If F1PDLE14 = YES, did this occur...

1 = in childhood
2 = in adulthood
3 = In childhood AND adulthood
F1PDLE15  15. experienced unwanted sexual activity as a result of force, threat of harm, or manipulation.

F1PDLE15A  If F1PDLE15 = YES, did this occur…
1 = in childhood
2 = in adulthood
3 = In childhood AND adulthood
COMBAT EXPERIENCES

Instrument Administered:

First Post-Deployment - Field names are as below

These questions ask about experiences you may have had ever encountered during your most recent deployment period. Please answer each question by indicating (YES or NO) which you feel most appropriately fits your experiences during deployment.

F1CEA1 - F1CEA16 are coded as follows:

0 = No
1 = Yes

F1CEA1  1. Being attached or ambushed
F1CEA2  2. Receiving incoming artillery, rocket, or mortar fires
F1CEA3  3. Being shot at or receiving small-arms fire
F1CEA4  4. Shooting or directing fire at the enemy
F1CEA5  5. Being responsible for the death of an enemy combatant
F1CEA6  6. Seeing dead bodies or human remains
F1CEA7  7. Handling or uncovering human remains
F1CEA8  8. Seeing dead or seriously injured Americans
F1CEA9  9. Knowing someone seriously injured or killed
F1CEA10 10. Participating in demining operations
F1CEA11 11. Seeing ill or injured women or children whom you were unable to help
F1CEA12 12. Being wounded or injured
F1CEA13 13. Had a buddy shot or hit who was near you
F1CEA14 14. Clearing or searching homes or buildings
F1CEA15 15. Engaging in hand-to-hand combat

F1CEA16 16. Saved the life of a soldier or civilian

F1CEB Have you deployed to a combat zone prior to this most recent deployment?

0 = No

1 = Yes

If F1CEB=1 (Yes), continue. Otherwise, skip to Audit C

Repeat questions below for any/all deployments prior to the most recent one.
F1CEB1 – F1CEB16 are coded as follows:

0 = No

1 = Yes

F1CEB1  1. Being attached or ambushed
F1CEB2  2. Receiving incoming artillery, rocket, or mortar fires
F1CEB3  3. Being shot at or receiving small-arms fire
F1CEB4  4. Shooting or directing fire at the enemy
F1CEB5  5. Being responsible for the death of an enemy combatant
F1CEB6  6. Seeing dead bodies or human remains
F1CEB7  7. Handling or uncovering human remains
F1CEB8  8. Seeing dead or seriously injured Americans
F1CEB9  9. Knowing someone seriously injured or killed
F1CEB10 10. Participating in demining operations
F1CEB11 11. Seeing ill or injured women or children whom you were unable to help
F1CEB12 12. Being wounded or injured
F1CEB13 13. Had a buddy shot or hit who was near you
F1CEB14 14. Clearing or searching homes or buildings
F1CEB15 15. Engaging in hand-to-hand combat
F1CEB16 16. Saved the life of a soldier or civilian

Scoring:

SUMF1CEA Sum of 16 items regarding most recent deployment

SUMF1CEB Sum of 16 items regarding all deployments prior to most recent one.
**AUDIT C**

**Instrument Administered:**

**First Post-Deployment** - Field names are as below

**Final Post-Deployment** - Change “F1” prefix for field names to “F2”

F1AUDIT1 1. How often did you have a drink containing alcohol in the past 3 months?

   1 = Never
   2 = Monthly or less
   3 = Two or four times a month
   4 = Two or three times a week
   5 = Four or more times a week

F1AUDIT2 2. How many drinks did you have on a typical day when you were drinking in the past 3 months?

   1 = None, I do not drink
   2 = 1 or 2
   3 = 3 or 4
   4 = 5 or 6
   5 = 7 to 9
   6 = 10 or more

F1AUDIT3 3. How often did you have six or more drinks on one occasion in the past 3 months?

   1 = Never
2 = Less than monthly
3 = Monthly
4 = Weekly
5 = Daily or almost daily
PAIN QUESTIONNAIRE

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change “F1” prefix for field names to “F2”

F1PAIN1 1. Rate your current level of pain on a 0 to 10 scale
          0 = No pain
          1 =
          2 =
          3 =
          4 =
          5 =
          6 =
          7 =
          8 =
          9 =
          10 = Extreme pain

F1PAIN2 2. Do you take over the counter or prescription medication for pain on a daily basis?
          0 = No
          1 = Yes

F1PAIN3 3. If YES to F1PAIN2, is the pain medication over the counter or prescription?
1 = Over the counter
2 = Prescription
SF-12

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change “F1” prefix for field names to “F2”

1. In general:

2. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

   a. Does your health limit you in moderate activities such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?

   b. Does your health limit you in climbing several flights of stairs?

3. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

   a. Have you accomplished less than you would like (because of your physical health)?

   b. Have you been limited in the kind of work or other activities you’ve done (because of your physical health)?
4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?
   - F1SF4A a. Have you accomplished less than you would like (because of any emotional problems)?
   - F1SF4B b. Did you not do work or other activities as carefully?

5. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

6. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...
   - F1SF6A a. Have you felt calm and peaceful?
   - F1SF6B b. How much of the time during the past 4 weeks did you have a lot of energy?
c. How much of the time during the past 4 weeks have you felt downhearted and blue?

7. During the past 4 weeks how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends or relatives)?

SF-12 Physical Health Summary Score

SF-12 Mental Health Summary Score
UNIT COHESION

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change "F1" prefix for field names to "F2"

The statements below are about your relationships with other military personnel. Please reach each statement and circle and answer to indicate how much you agree or disagree with each item.

F1UNIT1 – F1UNIT12 are coded as follows:

1 = Strongly disagree
2 = Somewhat disagree
3 = Neither agree nor disagree
4 = Somewhat agree
5 = Strongly agree

F1UNIT1 1. My unit was like a family to me.

F1UNIT2 2. I felt a sense of camaraderie between myself and the other soldiers in my unit.

F1UNIT3 3. Members of my unit understood me.

F1UNIT4 4. Most people in my unit were trustworthy.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>F1UNIT5</td>
<td>5. I could go to most people in my unit for help when I had a personal problem.</td>
</tr>
<tr>
<td>F1UNIT6</td>
<td>6. The commanding officer(s) were interested in what I thought and how I felt about things.</td>
</tr>
<tr>
<td>F1UNIT7</td>
<td>7. I was impressed by the quality of leadership in my unit.</td>
</tr>
<tr>
<td>F1UNIT8</td>
<td>8. My superiors made a real attempt to treat me as a person.</td>
</tr>
<tr>
<td>F1UNIT9</td>
<td>9. The commanding officer(s) in my unit were supportive of my efforts.</td>
</tr>
<tr>
<td>F1UNIT10</td>
<td>10. I felt like my efforts really counted to the military.</td>
</tr>
<tr>
<td>F1UNIT11</td>
<td>11. The military appreciated my service.</td>
</tr>
<tr>
<td>F1UNIT12</td>
<td>12. I was supported by the military.</td>
</tr>
</tbody>
</table>
DAY-TO-DAY EXPERIENCES

Instrument Administered:

First Post-Deployment - Field names are as below

Final Post-Deployment - Change “F1” prefix for field names to “F2”

Below is a collection of statements about your everyday experiences. 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.

F1MINDFUL1 – F1MINDFUL15 are coded as follows:

1 = Almost always
2 = Very frequently
3 = Somewhat frequently
4 = Somewhat infrequently
5 = Very infrequently
6 = Almost never

F1MINDFUL1 1. I could be experiencing some emotional and not be conscious of it until some time later.

F1MINDFUL2 2. I break or spill things because of carelessness, not paying attention, or thinking of something else.

F1MINDFUL3 3. I find it difficult to stay focused on what’s happening in the present.
4. I tend to walk quickly to get where I’m going without paying attention to what I experience along the way.

5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.

6. I forget a person’s name almost as soon as I’ve been told it for the first time.

7. It seems I am “running on automatic”, without much awareness of what I’m doing.

8. I rush through activities without being really attentive to them.

9. 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.

10. I do jobs or tasks automatically, without being aware of what I’m doing.

11. I find myself listening to someone with one ear, doing something else at the same time.

12. I drive places on “automatic pilot” and then wonder why I went there.

13. I find myself preoccupied with the future or the past.

F1MINDFUL15  15. I snack without being aware that I’m eating.

F1MINFULSCR  Score (mean of 15 items)
APP USE QUESTIONNAIRE

Instrument Administered:

First Post-Deployment - Field names are as below

F1APP1  Are you in the control group or the intervention group for this study?

1 = Control
2 = Intervention

If F1APP1 = 1, ask question a below. If F1APP1=2, skip to F1APPBC1

F1APP1A If control, did you by chance use the Breath Pacer or IMAT app at any time since your last research interview with us?

0 = No
1 = Yes

If F1APP1A = 1, continue. Otherwise, interview is STOPPED

Before arriving in country:

F1APPBC1 1. After receiving training on the iPod Touch app, about how many times did you use the app before deploying overseas?

1 = Not at all
2 = Less than 1 time per month
3 = 1-3 times per month
4 = 1-2 times per week
2. About how many times did you use the skills taught in the app without actually using the app itself before deploying overseas?

1 = Not at all
2 = Less than 1 time per month
3 = 1-3 times per month
4 = 1-2 times per week
5 = 3-4 times per week
6 = 5-7 times per week
7 = More than 7 times per week
3. For about how many minutes did you use the app each time before deploying overseas?

1 = Did not use the app
2 = Less than 1 minute each time
3 = 1-2 minutes each time
4 = 3-4 minutes each time
5 = 5 or more minutes each time

4. When did you most often use the app before deploying overseas?

1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before a training exercise, giving a briefing, standing watch, etc.)
5 = After a stressful event (e.g., events above, etc.)
6 = Other

If F1APPBC4 = 6 (other), specify (text field)

5. When did you find using the app to be most useful before deploying overseas?

1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before a training exercise, giving a briefing, standing watch, etc.)
5 = After a stressful event (e.g., events above, etc.)
6 = Other

F1APPBC5OTH If F1APPBC5 = 6 (other), specify (text field)
In country:

F1APPIC1 1. About how many times did you use the app while in country?
   1 = Not at all
   2 = Less than 1 time per month
   3 = 1-3 times per month
   4 = 1-2 times per week
   5 = 3-4 times per week
   6 = 5-7 times per week
   7 = More than 7 times per week

F1APPIC2 2. About how many times did you use the skills taught in the app without actually using the app itself while in country?
   1 = Not at all
   2 = Less than 1 time per month
   3 = 1-3 times per month
   4 = 1-2 times per week
   5 = 3-4 times per week
   6 = 5-7 times per week
   7 = More than 7 times per week

F1APPIC3 3. For about how many minutes did you use the app each time while in country?
   1 = Did not use the app
   2 = Less than 1 minute each time
   3 = 1-2 minutes each time

100
4 = 3-4 minutes each time
5 = 5 or more minutes each time

F1APPIC4 4. When did you most often use the app while in country?

1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before a convoy, patrol, mission, standing watch, etc.)
5 = After a stressful event (e.g., after a firefight, combat, events above, etc.)
6 = Other

F1APPIC4OTH If F1APPIC4 = 6 (other), specify (text field)
5. When did you find using the app to be most useful while in country?

1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before a convoy, patrol, mission, standing watch, etc.)
5 = After a stressful event (e.g., after a firefight, combat, events above, etc.)
6 = Other

If F1APPIC5 = 6 (other), specify (text field)

After deployment:

1. About how many times did you use the app after deployment?

1 = Not at all
2 = Less than 1 time per month
3 = 1-3 times per month
4 = 1-2 times per week
5 = 3-4 times per week
6 = 5-7 times per week
7 = More than 7 times per week

2. About how many times did you use the skills taught in the app without actually using the app itself after deployment?
1 = Not at all
2 = Less than 1 time per month
3 = 1-3 times per month
4 = 1-2 times per week
5 = 3-4 times per week
6 = 5-7 times per week
7 = More than 7 times per week

F1APPAD3 3. For about how many minutes did you use the app each time after deployment?
1 = Did not use the app
2 = Less than 1 minute each time
3 = 1-2 minutes each time
4 = 3-4 minutes each time
5 = 5 or more minutes each time
F1APPAD4  4. When did you most often use the app after deployment?

1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before giving a presentation, job interview, getting together with family or friends, etc.)
5 = After a stressful event (e.g., events above, etc.)
6 = Other

F1APPAD4OTH If F1APPAD4 = 6 (other), specify (text field)

F1APPAD5  5. When did you find using the app to be most useful after deployment?

1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before giving a presentation, job interview, getting together with family or friends, etc.)
5 = After a stressful event (e.g., events above, etc.)
6 = Other

F1APPAD5OTH If F1APPAD5 = 6 (other), specify (text field)

F1APPAD6  6. Did you recommend use of either app (Breath Pacer or IMAT) to anyone else?

0 = No
1 = Yes
F1APPAD6OTH If F1APPAD6 = 1 (Yes), who? (text field)

F1APPAD7 7. Is there any additional information related to using either app (Breath Pacer or IMAT) that you would like to tell us?

0 = No
1 = Yes

F1APPAD7OTH If F1APPAD7 = 1 (Yes), specify. (text field)
APP USE QUESTIONNAIRE

Instrument Administered:

Final Post-Deployment - Field names are as below

F2APP1 Are you in the control group or the intervention group for this study?

1 = Control

2 = Intervention

If F2APP1 = 1, ask question a below. If F2APP1 = 2, skip to F2APPRI1

F2APP1A If control, did you by chance use the Breath Pacer or IMAT app at any time since your last research interview with us?

0 = No

1 = Yes

If F2APP1A = 1, continue. Otherwise, interview is STOPPED

F2APPRI1 1. About how many times did you use the app in the past 6 months?

1 = Not at all

2 = Less than 1 time per month

3 = 1-3 times per month

4 = 1-2 times per week

5 = 3-4 times per week

6 = 5-7 times per week

7 = More than 7 times per week
2. For about how many minutes did you use the app each time in the past 6 months?

   1 = Did not use the app
   2 = Less than 1 minute each time
   3 = 1-2 minutes each time
   4 = 3-4 minutes each time
   5 = 5 or more minutes each time

3. When did you most often use the app in the past 6 months?

   1 = Did not use the app
   2 = After waking up
   3 = Before going to sleep
   4 = Before a planned stressful event (e.g., before giving a presentation, job interview, getting together with family or friends, etc.)
   5 = After a stressful event (e.g., events above, etc.)
   6 = Other

If F2APPRI3 = 6 (other), specify (text field)

4. When did you find using the app to be most useful in the past 6 months?

   1 = Did not use the app
   2 = After waking up
   3 = Before going to sleep
   4 = Before a planned stressful event (e.g., before giving a presentation, job interview, getting together with family or friends, etc.)
   5 = After a stressful event (e.g., events above, etc.)
   6 = Other
F2APPRI4OTH  If F2APPRI4 = 6 (other), specify (text field)

F2APPRI5  5. About how many times did you use the skills taught in the app without actually using the app itself in the past 6 months?

1 = Not at all
2 = Less than 1 time per month
3 = 1-3 times per month
4 = 1-2 times per week
5 = 3-4 times per week
6 = 5-7 times per week
7 = More than 7 times per week

F2APPRI6  6. For about how many minutes did you use the skills taught in the app without actually using the app itself in the past 6 months?

1 = Did not use the app
2 = Less than 1 minute each time
3 = 1-2 minutes each time
4 = 3-4 minutes each time

F2APPRI7  7. When did you most often use the skills taught in the app without actually using the app itself in the past 6 months?

1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before giving a presentation, job interview, getting together with family or friends, etc.)
5 = After a stressful event (e.g., events above, etc.)
6 = Other

F2APPRI7OTH  If F2APPRI7 = 6 (other), specify (text field)

F2APPRI8 8. When did you find using the skills taught in the app without actually using the app itself to be most useful in the past 6 months?
1 = Did not use the app
2 = After waking up
3 = Before going to sleep
4 = Before a planned stressful event (e.g., before giving a presentation, job interview, getting together with family or friends, etc.)
5 = After a stressful event (e.g., events above, etc.)
6 = Other

F2APPRI8OTH  If F2APPRI8 = 6 (other), specify (text field)

F2APPRI9 9. Did you recommend use of the app (Breath Pacer if iMat) to anyone else?
0 = No
1 = Yes

F2APPRI9A  If F2APPRI9 = 1 (YES), who? (text field)

F2APPRI10 10. Is there any additional information related to using either app (Breath Pacer or iMat) that you would like to tell us?
0 = No
1 = Yes

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F2APPR10A  If F2APPR10 = 1 (YES), please specify? (text field)
Physiological Data:

Administered:

Baseline - Field names are as below

First Post-Deployment - Add “F1” as prefix to Baseline field names

NOTE: The data for 386 participants are included for Baseline Assessment. Heart Math could not process the others.

Baseline 1: (Baseline 0-3 minutes)

BL1_NUMPTS  Number of data points (Field not included in First Post-Deployment)
BL1_LENGTH_S  Length (in seconds)
BL1_HR_BPM  Heart Rate (beats per minute)
BL1_IBI_MS  IBI (Inter-beat interval)
BL1_SDNNI  SDNN Index
BL1_TP  Total Power
BL1_VLF  Very Low Frequency
BL1_LF  Low Frequency
BL1_LNLF  Log scale of low frequency
BL1_HF  High Frequency
BL1_LFXHF  LF/HF Ratio
BL1_LNTP  Log scale of Total Power
BL1_LNVLF  Log scale of Very low frequency
BL1_LNHF  Log scale of High frequency
BL1_LNLFXHF  Log scale of LF/HF Ratio

Baseline 2: (Baseline 3-6 minutes)
**BL2.NUMPTS**  Number of data points *(Field not included in First Post-Deployment)*

**BL2.LENGTH_S**  Length (in seconds)

**BL2.HR_BPM**  Heart Rate (beats per minute)
**BL2.IBI_MS**  IBI (Inter-beat interval)

**BL2.SDNNI**  SDNN Index

**BL2.TP**  Total Power

**BL2.VLF**  Very Low Frequency

**BL2.LF**  Low Frequency

**BL2.HF**  High Frequency

**BL2.LFXHF**  LF/HF Ratio

**BL2.LNTP**  Log scale of Total Power

**BL2.LNVLF**  Log scale of Very low frequency

**BL2.LNFL**  Log scale of low frequency

**BL2.LNHF**  Log scale of High frequency

**BL2.LNLFXHF**  Log scale of LF/HF Ratio

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**Baseline 3:** *(Baseline 6-9 minutes)*

**BL3.NUMPTS**  Number of data points *(Field not included in First Post-Deployment)*

**BL3.LENGTH_S**  Length (in seconds)

**BL3.HR_BPM**  Heart Rate (beats per minute)
**BL3.IBI_MS**  IBI (Inter-beat interval)

**BL3.SDNNI**  SDNN Index

**BL3.TP**  Total Power

**BL3.VLF**  Very Low Frequency

**BL3.LF**  Low Frequency
BL3_LNLF  Log scale of low frequency
BL3_HF    High Frequency
BL3_LFXHF LF/HF Ratio
BL3_LNTP  Log scale of Total Power
BL3_LNVLF Log scale of Very low frequency
BL3_LNHF  Log scale of High frequency
BL3_LNLFXHF Log scale of LF/HF Ratio

Startle 1: (Startle 0-3 minutes)

ST1_NUMPTS Number of data points (Field not included in First Post-Deployment)

ST1_LENGTH_S Length (in seconds)
ST1_HR_BPM  Heart Rate (beats per minute)
ST1_IBI_MS  IBI (Inter-beat interval)
ST1_SDNNI  SDNN Index
ST1_TP     Total Power
ST1_VLF    Very Low Frequency
ST1_LF     Low Frequency
ST1_LNLF   Log scale of low frequency
ST1_HF     High Frequency
ST1_LFXHF LF/HF Ratio
ST1_LNTP   Log scale of Total Power
ST1_LNVLF Log scale of Very low frequency
ST1_LNHF  Log scale of High frequency
ST1_LNLFXHF Log scale of LF/HF Ratio
### Startle 2: (Startle 3-6 minutes)

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<tr>
<th>Variable</th>
<th>Description</th>
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<tbody>
<tr>
<td>ST2_NUMPTS</td>
<td>Number of data points (Field not included in First Post-Deployment)</td>
</tr>
<tr>
<td>ST2_LENGTH_S</td>
<td>Length (in seconds)</td>
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<tr>
<td>ST2_HR_BPM</td>
<td>Heart Rate (beats per minute)</td>
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<td>ST2_TP</td>
<td>Total Power</td>
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### Startle 3: (Startle 6-9 minutes)

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<th>Variable</th>
<th>Description</th>
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<tr>
<td>ST3_NUMPTS</td>
<td>Number of data points (Field not included in First Post-Deployment)</td>
</tr>
<tr>
<td>ST3_LENGTH_S</td>
<td>Length (in seconds)</td>
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<tr>
<td>ST3_HR_BPM</td>
<td>Heart Rate (beats per minute)</td>
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<td>ST3_IBI_MS</td>
<td>IBI (Inter-beat interval)</td>
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<td>SDNN Index</td>
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<td>ST3_TP</td>
<td>Total Power</td>
</tr>
<tr>
<td>ST3_VLF</td>
<td>Very Low Frequency</td>
</tr>
</tbody>
</table>
Virtual Reality: (Virtual Reality 0-3 minutes)

VR_NUMPTS  Number of data points (Field not included in First Post-Deployment)

VR_LENGTH_S  Length (in seconds)
VR_HR_BPM  Heart Rate (beats per minute)
VR_IBI_MS  IBI (Inter-beat interval)
VR_SDNNI  SDNN Index
VR_TP  Total Power
VR_VLF  Very Low Frequency
VR_LF  Low Frequency
VR_LNLF  Log scale of low frequency
VR_HF  High Frequency
VR_LFXHF  LF/HF Ratio
VR_LNTP  Log scale of Total Power
VR_LNVLF  Log scale of Very low frequency
VR_LNHF  Log scale of High frequency
VR_LNLFXHF  Log scale of LF/HF Ratio
Cool Down 1: (Cool Down 0-3 minutes)

***NOTE: Not included in First Post-Deployment dataset***

CD1_NUMPTS Number of data points
CD1_LENGTH_S Length (in seconds)
CD1_HR_BPM Heart Rate (beats per minute)
CD1_IBI_MS IBI (Inter-beat interval)
CD1_SDNNI SDNN Index
CD1_TP Total Power
CD1_VLF Very Low Frequency
CD1_LF Low Frequency
CD1_LNLF Log scale of low frequency
CD1_HF High Frequency
CD1_LFXHF LF/HF Ratio
CD1_LNTP Log scale of Total Power
CD1_LNVLF Log scale of Very low frequency
CD1_LNHF Log scale of High frequency
CD1_LNLFXHF Log scale of LF/HF Ratio

Cool Down 2: (Cool Down 2-5 minutes)

CD2_NUMPTS Number of data points (Field not included in First Post-Deployment)
CD2_LENGTH_S Length (in seconds)
CD2_HR_BPM Heart Rate (beats per minute)
CD2_IBI_MS IBI (Inter-beat interval)
CD2_SDNNI SDNN Index
CD2_TP Total Power
| CD2_VLF       | Very Low Frequency                      |
| CD2_LF       | Low Frequency                            |
| CD2_LNLF     | Log scale of low frequency              |
| CD2_HF       | High Frequency                           |
| CD2_LFXHF    | LF/HF Ratio                              |
| CD2_LNTP     | Log scale of Total Power                 |
| CD2_LNVLF    | Log scale of Very low frequency         |
| CD2_LNHF     | Log scale of High frequency             |
| CD2_LNLFXHF  | Log scale of LF/HF Ratio                |
Cognitive Bias Assessment Data:

Program Administered:

Baseline - Field names are as below

First Post-Deployment - Add "F1" as prefix to Baseline field names

NOTE: In the field name, the _1 changes to the next consecutive number for each Scenario ID. To see Scenario ID’s please see Appendix A at the end of this document. Total possible – 10

TRIAL_1 Trial # (1-10)

TRIALRESPONSE1_1 Accuracy of response to comprehension question

0 = Incorrect
1 = Correct

TRIALRESPONSETIME_1 Response time (seconds) to comprehension question

TRIALRESPONSE2_1 Response to scale that asks how well you could develop a realistic image for the scenario (1-9)

1 = Not at all well
2 =
3 = A little bit
4 =
5 = Moderately
6 =
7 = Very much
8
9 = Extremely

TRIALMEMORY_1  Order that the ScenarioID appears for the Memory Portion of the assessment (1-10)

TRIALMEMORY1_1  Response (1-9) to Sentence that appears first
    1 = Not at all accurate
    2 =
    3 = A little bit accurate
    4 =
    5 = Moderately accurate
    6 =
    7 = Very much accurate
    8
    9 = Extremely accurate

TRIALMEMORY2_1  Response (1-9) to Sentence that appears second
    1 = Not at all accurate
    2 =
    3 = A little bit accurate
    4 =
    5 = Moderately accurate
    6 =
    7 = Very much accurate
8

9 = Extremely accurate

TRIALMEMORY3_1  Response (1-9) to Sentence that appears third

1 = Not at all accurate

2 =

3 = A little bit accurate

4 =

5 = Moderately accurate

6 =

7 = Very much accurate

8

9 = Extremely accurate

TRIALMEMORY4_1  Response (1-9) to Sentence that appears fourth

1 = Not at all accurate

2 =

3 = A little bit accurate

4 =

5 = Moderately accurate

6 =

7 = Very much accurate

8

9 = Extremely accurate
The scored variables were created as follows:
IF TRIALMEMORYRAND1=1 THEN MX1=TRIALMEMORY1;
IF TRIALMEMORYRAND2=1 THEN MX1=TRIALMEMORY2;
IF TRIALMEMORYRAND3=1 THEN MX1=TRIALMEMORY3;
IF TRIALMEMORYRAND4=1 THEN MX1=TRIALMEMORY4;
IF TRIALMEMORYRAND1=2 THEN MX2=TRIALMEMORY1;
IF TRIALMEMORYRAND2=2 THEN MX2=TRIALMEMORY2;
IF TRIALMEMORYRAND3=2 THEN MX2=TRIALMEMORY3;
IF TRIALMEMORYRAND4=2 THEN MX2=TRIALMEMORY4;
IF TRIALMEMORYRAND1=3 THEN MX3=TRIALMEMORY1;
IF TRIALMEMORYRAND2=3 THEN MX3=TRIALMEMORY2;
IF TRIALMEMORYRAND3=3 THEN MX3=TRIALMEMORY3;
IF TRIALMEMORYRAND4=3 THEN MX3=TRIALMEMORY4;
IF TRIALMEMORYRAND1=4 THEN MX4=TRIALMEMORY1;
IF TRIALMEMORYRAND2=4 THEN MX4=TRIALMEMORY2;
IF TRIALMEMORYRAND3=4 THEN MX4=TRIALMEMORY3;
IF TRIALMEMORYRAND4=4 THEN MX4=TRIALMEMORY4;
IF SCENARIOID NE 6 THEN RESPBIAS=(MX2+MX4)/(MX1+MX3);
IF SCENARIOID NE 6 THEN SENSITIVITY=MX2/MX1;
IF SCENARIOID EQ 6 THEN RESPBIAS=(MX4+MX2)/(MX1+MX3);
IF SCENARIOID EQ 6 THEN SENSITIVITY=MX4/MX3;
SUPPLEMENT A: Cognitive Assessment Scenarios and Memory Questions

1: Imagining Things

After 3 months into deployment with little sleep, you are on a mission at 0245. You see what appears to be a person on a bicycle through your NVG’s. Upon closer inspection you realize the object was only in your imagination. Worried about your effectiveness on the mission, you send word to your superior and relay your concern.

Did you contact your superior?

Correct Response: YES

Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. You send word to your superior because you need to get some sleep.
2. You send word to your superior because you fear you may be going permanently crazy.
3. You send word to your superior because you could use some company.
4. You send word to your superior because you feel that you can’t trust yourself to do the job alone.

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2: Trust for Local Citizens

After several months on duty, you have developed negative thoughts and feelings about local civilians. You no longer trust even the local authorities. Whenever you have to work with the local authorities, you feel that you have to watch your back constantly.

At times, are you assigned to work with local authorities?

Correct Response: YES

Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. Whenever you have to work with the local authorities, you feel that you have to watch your back constantly because you think that they are incompetent.
2. Whenever you have to work with the local authorities, you feel that you have to watch your back constantly because you think that nothing good can happen to you anymore.
3. Whenever you have to work with the local authorities, you feel that you have to keep your distance because you want them to feel confident to take on more responsibility.
4. Whenever you have to work with the local authorities, you feel that you have to keep your distance because you feel isolated and set apart from others.

3: Children Celebrating

You are on foot patrol when you hear shouting. As you raise your rifle and turn to locate the noise, you realize that it is a group of children playing soccer in an alley. You quickly glance to see how the others in your unit acted.

Were the children being quiet?

Correct Response: NO

Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. You look around to see how other soldiers in your unit reacted to make sure no one has their weapons at ready.
2. You look around to see how other soldiers in your unit reacted because you are afraid that your reaction might mean that there is something wrong with you.
3. You look around at all the children to ensure that everyone is safe.
4. You look around at all the children and remember how you used to be happy but now you are always miserable.

4: Change of Orders

You are exhausted from long work hours. You are scheduled to work on convoy operations, but as you prepare to leave, your commanding officer approaches you and tells you that your orders have changed, and you are to remain at the base until further notice.

Were you originally scheduled to go on foot patrol?

Correct Response: NO

Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. Your commanding officer tells you that your orders have changed, and you are to remain at the base until further notice because you are going to be promoted.
2. Your commanding officer tells you that your orders have changed, and you are to remain at the base until further notice because you are weak.
3. Your commanding officer tells you that your orders have changed, and you are to report to another NCO who is in need of your help.
4. Your commanding officer tells you that your orders have changed, and you are to report to another NCO because you are inadequate.

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5: The IED

You have been on a relatively quiet mounted patrol when you see something on the side of the road that the HUMVEE in front of you is about to pass. You radio the HUMVEE in front of you, but it is too late and an IED explodes disabling the HUMVEE. You immediately radio to higher command, but you cannot make sense of the reply.

Were you on foot patrol?

Correct Response: NO

Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. Your commander responds to your call, but you can barely understand what he is saying because there is a poor connection.
2. Your commander responds to your call, but you can barely understand what he is saying because you are unable to cope with the situation.
3. Your commander responds to your call, but you do not hear him because you left your radio to help the injured soldiers.
4. Your commander responds to your call, but you do not hear him because you left your radio because you are overwhelmed with fear and can’t trust that you will do the right thing.

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6: A Child Approaches

You are on post guarding an entrance to a government building when you spot a child walking towards your position, carrying a backpack. You immediately tell him to halt.

Was the child carrying a backpack?

Correct Response: YES
Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. You reach into your pocket to find some candy to give to the child.
2. You reach into your pocket to find your knife because you feel that something bad is bound to happen, it always does.
3. You tell the child to halt because he is crossing a busy intersection and you fear that he might get hurt.
4. You tell the child to halt because you feel that you can no longer trust anyone.

7: Training Police Recruits

You are assigned to help train new police recruits. During morning chow, you hear that two senior police officials were gunned down. You tell another member of your unit that you are concerned about going to the police station today.

Did you eat breakfast?

Correct Response: YES

Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. You tell another member of your unit that you are concerned about going to the police station because you think that the new recruits will be nervous and decide to quit.
2. You tell another member of your unit that you are concerned about going to the police station because you feel that you will not be able to control your anger and will do something terrible.
3. You tell another member of your unit that you do not want to go to the police station because you would rather search for the shooter.
4. You tell another member of your unit that you do not want to go to the police station because you feel that if you think about the event, you will not be able to handle it.

8: Truck Breaks Down

While on patrol, your truck breaks down. You inspect the truck and locate the problem, but quickly realize that you will not be able to fix the truck.

Were you at the base?

Correct Response: NO
Comments to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. You realize that you will not be able to fix the truck because you do not have the right tools.
2. You realize that you will not be able to fix the truck because you are inadequate.
3. You realize that you will need to call for help to fix the truck so that you can obtain the appropriate tools.
4. You realize that you will need to call for help to fix the truck because you are not able to tolerate this mishap and you feel yourself beginning to fall apart.

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9: Your Birthday Party

You have been on deployment for six months and your fellow unit members have learned your birthday is coming up. While there are no "parties" celebrated and their supplies are relatively small, the other members in your unit ask you what you’d like. You cannot think of anything in particular.

Are birthdays routinely celebrated on base?

Correct Response: NO

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Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. You cannot think of things you would like at your party because you would rather keep it low-key.
2. You cannot think of things you would like at your party because you feel like you don’t even know yourself anymore.
3. You tell your friends that you do not want a party because you know that you are going to have a big assignment the next day.
4. You tell your friends that you do not want a party because you just feel dead inside.

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10: Gunfire in the Distance

While on patrol you hear gunfire in the distance. Unable to reach your command on the radio you have little idea about what is happening. Others in your patrol want to go and see what happened but you decide to carry on with the main route of the patrol.

Do the other members of the patrol want to ignore the gunfire?

Correct Response: NO
Sentences to Rate (1-9) with 1 being Not at All Accurate and 9 being Extremely Accurate:

1. You tell the others to maintain the route because you are concerned for their safety.
2. You tell the others to maintain the route because you are overwhelmed with fear.
3. You tell the others that you will investigate because you are a confident leader.
4. You tell the others that you will investigate because you cannot control your anger and you make rash decisions.