

AWARD NUMBER: W81XWH-19-2-0064

TITLE: Mindfulness-based Attention Training to Bolster Small Team Performance

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REPORT DATE: October 2021

TYPE OF REPORT: Annual Report

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

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REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE October 2021		2. REPORT TYPE Annual		3. DATES COVERED 30 SEP 2020 - 29 SEP 2021	
4. TITLE AND SUBTITLE  Mindfulness-based Attention Training to Bolster Small Team				5a. CONTRACT NUMBER W81XWH-19-2-0064	
				5b. GRANT NUMBER PT180178	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)  Amishi P. Jha, Ph.D.  E-Mail: a.jha@miami.edu				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  University of Miami 5665 Ponce de Leon Blvd. Department of Psychology Coral Gables, FL 33146				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)  U.S. Army Medical Research and Development Command Fort Detrick, Maryland 21702-5012				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT  Approved for Public Release; Distribution Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT  The overarching aim of this proposal is to develop, deliver, and investigate the efficacy of MBAT-Team (MBAT-T) as a tool to promote individual cognitive performance, resilience, interpersonal interactions, and team-level operational performance. The MBAT-T program will be tested and compared to the standard MBAT for individuals (MBAT-I) and a no-training control group. We hypothesize that MBAT-T will benefit squads across all 3 key domains: cognitive performance and resilience, interpersonal interactions, and team-level operational performance. During the first year, we received approval from the University of Miami IRB and HRPO (Army), secured a site for the project, and made steady progress on the coordination with the testing sites and research consultants, and the development of the study materials, neurobehavioral-testing battery for the project, and a web-based application for the dissemination of mindfulness exercises to Soldiers involved in the study. During the second year, all materials and components discussed above were finalized and reviewed extensively by the research team before study launch. Furthermore, we launch the first round of the study by recruiting, screening, and enrolling 15 squads of Soldiers as planned, delivering both testing and training portions of the study, and collecting and performing interim analyses on the data. Finally, progress was made towards the coordination of the second round of the project, to be delivered in Year 3. In summary, our timely success reaching our project milestones over this past year leave us well-positioned for continued success in the execution of this project in the coming year(s).					
15. SUBJECT TERMS None listed.					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			USAMRMC
Unclassified	Unclassified	Unclassified	Unclassified	32	19b. TELEPHONE NUMBER (include area code)

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## **1. INTRODUCTION:**

For the U.S. Army and the U.S. Department of Defense (DOD), the 9 to 12-person infantry squad is considered the “most fundamental formation” for its close combat activities (Roper, 2018). Thus, there is strong interest and need in providing innovative evidence-based training to small teams to “strengthen the combat lethality, resiliency, and readiness of infantry squads” (Secretary of Defense, 2018). Mindfulness is a mental mode characterized by attention to present moment experience without conceptual elaboration and emotional reactivity. Mindfulness training (MT) programs provide guided exercises, didactic information, and discussions to promote greater mindfulness in trainees. MT has been found to protect against psychological illness and promote psychological health. It is a form of attention and resilience training shown to yield cognitive and emotional benefits in civilians and military service members (Jha et al., 2010; Jha et al., 2015). Yet, no studies to date have investigated the putative benefits of MT for the effectiveness of small teams. Herein, we investigate if mindfulness-based attention training (MBAT) contextualized for small unit infantry squads (MBAT-Team) might benefit squads in three key domains: 1) individual cognitive (attention and working memory) and resilience skills, 2) interpersonal skills such as team cohesion, interpersonal situation monitoring and emotional awareness, 3) and team-level operational performance related to lethality– the ability to shoot, move, and communicate. Thus, we aim to investigate the utility of mindfulness training to improve individual, interpersonal, and operationally relevant skills in support of small teams (i.e., *the squad*). If effective, MBAT-Team could bolster the U.S. Military’s capacity to further train and support infantry squads.

## **2. KEYWORDS:**

Attention, Cognitive Performance, Interpersonal Skills, Mindfulness Training, Resilience, Small Teams, Team Cohesion, Operational Performance, Working Memory

## **3. ACCOMPLISHMENTS:**

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

The Deliverables Table from the approved SOW is provided below with details regarding the major Tasks and corresponding sub-tasks, along with their target execution timeline in quarters and current completion status.

**Table 1. SOW Deliverables Table**

Deliverables	Year/quarter		Status
	Start	End	29-Sep-21
Task 1. Prepare research protocol for IRB approval and pre-registration			
Hire and train research associates	Y1Q1	Y1Q1	completed
Prepare and refine human subjects research protocol for submission to University of Miami IRB	Y1Q1	Y1Q1	completed
Secure University of Miami IRB Approval	Y1Q1	Y1Q2	completed
Secure HRPO Approval	Y1Q1	Y1Q2	completed
Submit continuing review and annual reports, amendments, and protocol deviations as required and needed	Y1Q1	as needed	as needed
Prepare and submit pre-registration of the study on clinicaltrials.gov website	Y1Q1	Y1Q2	completed
Task 2. Finalize assessment measures			
Select the team-level operational metrics	Y1Q1	Y1Q2	completed
Refine the lab-based cognitive and self-reported interpersonal measures	Y1Q1	Y1Q2	completed
Discussion to determine final selection of operational metrics (Conflict Kinetics)	Y1Q1	Y1Q2	completed
Task 3. Prepare and develop training materials			
Develop the MBAT-T course materials and corresponding mindfulness exercises	Y1Q1	Y1Q3	completed
Refine and finalize the MBAT-I course materials	Y1Q1	Y1Q3	completed
Develop the MBAT-T practicum and teaching materials	Y1Q3	Y1Q3	completed
Record all mindfulness exercises/training materials	Y1Q4	Y1Q4	completed
Military Leadership/Advisory Group Briefings on MBAT-T materials	Y1Q3	Y1Q4	completed
Task 4. Mobile Application (App) development and piloting			
Coordinate App Development for mindfulness exercise dissemination	Y1Q3	Y1Q3	completed
Finalize app development	Y1Q4	Y2Q1	completed
Recruit undergraduates ( <i>n</i> = 40) to test the app for 4 consecutive weeks	Y2Q1	Y2Q1	completed
Collect pilot data for app engagement and usage data	Y2Q2	Y2Q2	completed
Military Leadership/Advisory Team review of app	Y2Q2	Y2Q2	completed
Task 5. Deliver mindfulness practicum and refresher to trainers			
Provide training 'refresher' for foundational MBAT course to trainers by master trainer	Y1Q3	Y1Q4	completed
Deliver MBAT-T practicum to trainers by master trainer	Y1Q4	Y2Q2	completed
Evaluate trainers on their mindfulness teaching skills after practicum	Y2Q2	Y2Q2	completed
Provide trainers feedback on their mindfulness teaching skills	Y2Q2	Y2Q2	completed
Task 6. Deliver the MBAT-T and MBAT-I programs to Soldiers over 2 Rounds			
Round 1			
Recruit, schedule, and assign participants to the MBAT-T and MBAT-I programs	Y2Q2	Y2Q2	completed
Deliver the MBAT-T to 5 squads ( <i>n</i> = 50 soldiers)	Y2Q3	Y2Q4	completed
Deliver the MBAT-I to 5 squads ( <i>n</i> = 50 soldiers)	Y2Q3	Y2Q4	completed
Round 2			
Recruit, schedule, and assign participants to the MBAT-T and MBAT-I programs	Y2Q4	Y2Q4	in progress
Deliver the MBAT-T to 5 squads ( <i>n</i> = 50 soldiers)	Y3Q1	Y3Q2	
Deliver the MBAT-I to 5 squads ( <i>n</i> = 50 soldiers)	Y3Q1	Y3Q2	
Task 7. Compare and contrast MBAT-T and MBAT-I programs			
Round 1			
Collect cognitive tasks and operational measures data before (T1) and after (T2) MBAT-T and MBAT-I courses from participants in the training groups ( <i>n</i> = 100)	Y2Q3	Y2Q4	completed
Collect cognitive tasks and operational measures data at T1 and T2 from no-training participants ( <i>n</i> = 50)	Y2Q3	Y2Q4	completed
Perform interim analyses on Round 1 data	Y2Q4	Y2Q4	in progress
Round 2			
Collect cognitive tasks and operational measures data before (T1) and after (T2) MBAT-T and MBAT-I courses from participants in the training groups ( <i>n</i> = 100)	Y3Q1	Y3Q2	
Collect cognitive tasks and operational measures data at T1 and T2 from no-training participants ( <i>n</i> = 50)	Y3Q1	Y3Q2	
Analyze Round 1 and Round 2 data	Y3Q2	Y3Q3	
Task 8. Disseminate results			
Present interim and final results at conferences	Y2Q4	Y3Q4	
Prepare manuscripts	Y3Q2	Y3Q4	

**What was accomplished under these goals?**

**Summary:** During Year 2 (Y2) we completed **Task 3** by finalizing all the training-related materials, and **Task 4** by finalizing the development of the app and completing a pilot study with a 'convenience' sample of ROTC undergraduates to evaluate its feasibility. In addition, we also completed **Task 5** by delivering the training practicum followed by evaluating and providing feedback to the trainers who delivered MBAT to soldiers during Round 1. We made substantial progress on **Task 6**, by completing **Round 1** of the project and initiating the planning of **Round 2**. Similarly, for **Tasks 7**, we completed data collection for **Round 1**, and initiated data analyses by conducting data quality reviews, data preparation, and preliminary analyses on the T1 data.

Detailed descriptions for each of the major tasks and corresponding sub-tasks are provided below.

**Task 1. Prepare research protocol for IRB approval and pre-registration: Completed/ Modifications and Reports As needed**

In Y1, all the sub-tasks of Task 1 were completed as described in detail in the Y1 Annual Report. Sub-task (iv) is ongoing, as research amendments and other project-related reports may need to be submitted. During Y2 we made progress on sub-task (iv) by submitting a research amendment and the annual continuing review to the University of Miami IRB and HRPO. Progress is described in detail below.

(i) Hire and train research associates: *Completed*

(ii) Secure IRB Approval: *Completed*

(iii) Secure HRPO Approval: *Completed*

(iv) Submit continuing review and annual reports, amendments and protocols deviations as required and needed: *As needed*

In Y2Q1, the research team prepared and submitted a protocol amendment to the IRB at the University of Miami, including a detailed description of the operational metrics and the measuring Mindfulness app, as these were finalized during Y1. IRB approval was received on January 22<sup>nd</sup> and the amendment was then submitted to HRPO on January 28<sup>th</sup>. HRPO confirmed receipt and filing of the amendment on February 23<sup>rd</sup>, informed us that the amendment did not require official HRPO approval prior to the implementation in the study, and that no further action was required on the research team's part.

In Y2Q4, we submitted the yearly continuing review to the IRB at the University of Miami. The review was approved by the university's IRB on August 24<sup>th</sup>, and then was submitted to HRPO for review on September 14<sup>th</sup>. HRPO acknowledged receipt and approval of the continuing review on September 23<sup>rd</sup>, 2021.

(v) Pre-register the study on clinicaltrials.gov website: *Completed*

As described in Y1, the research team completed the registration of the current research study on clinicaltrials.gov. The project was released on clinicaltrials.gov and can be found at <https://clinicaltrials.gov/ct2/show/NCT04210076> (#NCT04210076).

## **Task 2. Finalize assessment measures: *Completed***

### (i) Select the team-level operational metrics: *Completed*

This task was completed and described in detail in the Y1 annual report.

### (ii) Refine the lab-based cognitive and self-reported interpersonal measures: *Completed*

This task was completed and described in detail in the Y1 annual report.

### (iii) Discussion to determine final selection of operational metrics (Conflict Kinetics): *Completed*

This task was completed and described in detail in the Y1 annual report.

## **Task 3. Prepare and develop Training Materials: *Completed***

As described in the previously submitted annual report, the MBAT-I course materials and mindfulness exercises common to both programs were prepared during Y1. In Y2, efforts were focused on completing the MBAT-T course and practicum materials, as well as refining the MBAT-I materials to ensure consistency between the two programs.

Furthermore, we made necessary adjustments to all materials following internal reviews and feedback received from our advisory team. All materials were completed in time for the delivery of Round 1.

### (i) Develop the MBAT-Team course materials: *Completed*

In Y2Q1, progress was made on the development and refinement of the MBAT-T materials. Specifically, we expanded on team-specific aspects of the program by refining the in-class exercises and adjusting the embedded practices of each training session. Emphasis was placed on how to better equate practices across the two MBAT programs. Furthermore, we adjusted the scripts of and recorded the guided mindfulness exercises, which were later provided to participants via the app for their assigned daily practice requirements.

In Y2Q2, the MBAT-T materials and corresponding training cards were finalized. Scott Rogers, the research team, and the advisory team reviewed the materials carefully and provided feedback that were integrated consistently throughout the quarter, until the materials were finalized entirely.

### (ii) Refine and finalize the MBAT-I course materials: *Completed*

While MBAT-I materials were completed during Y1, they were adjusted accordingly during Y2 to ensure uniformity between the two programs. The materials and corresponding training cards were finalized during Y2Q2.

### (iii) Develop the MBAT-T practicum and teaching materials: *Completed*

The teaching materials for the MBAT-T practicum were refined and completed during Y2Q1. Throughout Y2Q1 and Y2Q2, the materials were revisited and adjusted to reflect the adjustments made to the MBAT-T and MBAT-I programs. By the end of Y2Q2, all the teaching materials were finalized and carefully reviewed by the research team.

### (iv) Record all mindfulness exercises/training materials: *Completed*

As described in the Y1 Annual Report, the four mindfulness exercises common to both programs were developed and recorded in Y1. Throughout Y2Q1 and Y2Q2, the scripts of all practices were revisited as needed, according to the adjustments made to both MBAT programs. By the end of Y2Q2, the scripts for the exercises for both training programs were finalized and then recorded by Scott Rogers. During Y2Q3, the research team completed a thorough sound quality review of the mindfulness exercise recordings, both offline and via the mindfulness app. The research team collected feedback and worked together with Scott Rogers in re-recording the exercises through different means until we achieved the appropriate audio quality. All recordings were finalized and uploaded to the Measuring Mindfulness App in Y2Q3, prior to the delivery of Round 1.

(v) Military Leadership/Advisory Group Briefings on MBAT-T materials: *Completed*

Throughout Y2, the P.I. and Scott Rogers met with the advisory group and additional military leadership to collect feedback on the MBAT-T materials. The feedback collected during these meetings provided guidance for the adjustments made to the materials of both MBAT courses, the teaching and practicum materials, and the recordings of the mindfulness exercises.

- In Y2Q1, Scott Rogers met with the core advisory group to review the prepared materials and receive feedback aimed at finalizing core aspects of the courses' materials.
- In Y2Q1, the P.I. and Scott Rogers met with BG David Hodne, Commandant of the US Army Infantry School at Fort Benning, to review the materials of both programs and receive feedback on potential adjustments that would better align the materials for our military cohorts.
- In Y2Q2, Scott Rogers met with Dr. Tobias, a social psychologist with experience in the implementation of mindfulness trainings in organizational settings, and Dr. Adler of the Walter Reed Army Institute of Research. Dr. Tobias and Dr. Adler, who were introduced to the materials during a prior meeting in Y1, reviewed the adjustments made to the materials and provided additional feedback for its refinement. Furthermore, Dr. Adler provided guidance on directing one of the exercises utilized in the MBAT-T sessions that she had initially proposed as a potential addition to the program.

**Task 4. Mobile Application (App) development and piloting: *Completed***

As described in the Y1 Annual Report, by the end of Y1, we had completed the coordination of the app development. In Y2, efforts were focused on reviewing various aspects of the app and providing feedback to the app development team in order to finalize the app development prior to the beginning of Round 1 (see details below).

(i) Coordinate App Development for mindfulness exercise dissemination: *Completed*

This task was completed and described in detail in the Y1 annual report.

(ii) Finalize app development: *Completed*

In Y2Q1, we conducted several rounds of in-depth internal testing of the user-facing application and administrative portal. These included reviews of the application from the user-perspective and various functions of the app, reviews of the accuracy of the data



collected, and the features available through the administrative portal for the coordination of various research projects. The research team met internally to compile feedback and discuss features to be integrated and adjustments to be made. The feedback and requested edits were then provided to the app development team. Various meetings with the app developer team followed to review edits and determine needed adjustments. In Y2Q2 we gathered a substantial amount of feedback through a pilot study conducted with a convenience sample of University of Miami ROTC cadets ( $n = 17$ , see next section below).

In Y2Q3, the research team completed another round of in-depth internal testing and coordinated with the app development team via weekly meetings to track completion of new requests. In Y2Q3, prior to the beginning of Round 1, the edits were completed entirely, the development of the app was finalized, and the app underwent a thorough, final internal testing in preparation for the study launch.

While the app development was completed in time for the launch of Round 1, continued delays and technical errors on the side of the vendor prevented us from finalizing the app in its entirety by the end of Y2Q1. To address timely finalization of the app, the PI was consistently in contact with the CEO of the app company to ensure that the expected deadlines would be met timely, and our project's finalization would be given priority.

(iii) Recruit undergraduates ( $n = 40$ ) to test the app for 4 consecutive weeks: *Completed*

The preparations for the recruitment of undergraduates to participate in the pilot testing and coordination of the pilot study were initiated in Y1. To maximize the relevance of the pilot study, the most appropriate undergraduate sample for piloting was determined to be ROTC cadets attending the University of Miami. Dr. Jha connected with the University of Miami ROTC leadership to secure support for this pilot study. Due to COVID-19-related university furloughs, and scheduling delays associated with the holiday season, recruitment plans were shifted to begin in Y2Q1. During this time, the PI and research team made further progress in coordinating with the UM ROTC leadership and in preparing the materials to be utilized in the study. In Y2Q2, the research team collaborated with ROTC leadership to recruit cadets at the University of Miami for the pilot app study.

(iv) Collect pilot data for app engagement and usage data: *Completed*

This pilot study with UM ROTC cadets ( $n = 17$ ) allowed us to review the app's functionality and ease of use. Furthermore, the pilot study allowed us to test the administrative portal and evaluate the data outputs provided by the app. Participants were instructed to engage with the app and complete daily mindfulness exercises for a period of two consecutive weeks. Collection of the pilot data was completed in Y2Q2. The research team reviewed the data outputs from the two weeks of users' engagement with the app and compiled a list of needed edits to the structure and format of the data outputs. This list was then communicated to the development company. The app development company worked on these edits throughout Y2Q2.

(v) Military Leadership/Advisory Team review of app: *Completed*

Throughout Y2, the project team coordinated with the military leadership to review the app's overall look and functionality.

- In Y2Q2 we conducted the first round of review with the military contacts at Ft. Drum to test access to the app via military emails. The testing was successful: the POCs were able to receive communications from the app's website, sign-up, and interact with the app via their military email. During this quarter, the research team also developed a checklist document to guide our military contacts through the second round of review, including a list of features to review and step-by-step instructions.
- In Y2Q3, we conducted the second round of review with the military liaison for the study, who reviewed the overall look and functionality of the app and confirmed its appropriateness prior to dissemination to soldiers. Furthermore, during this quarter, the mindfulness exercise recordings were reviewed by the military advisory group. Following their feedback, slight adjustments were made, and the finalized versions were uploaded and tested in the app by the research team before study launch.

**Task 5. Deliver mindfulness practicum and refresher to trainers: *Completed***

Subtask (i) was completed and described in detail in the Y1 Annual Report. In Y2, the master trainer delivered the MBAT-T practicum to the trainers in Y2Q2 and Y2Q3, during which trainers were introduced to the MBAT-T program and discussed and practiced its delivery. Throughout both quarters, the master trainer evaluated the trainers and provided feedback on their mindfulness teaching skills. All trainers were deemed successful in learning and delivering both programs and were consequently approved to engage in the delivery of the programs to soldiers during Round 1 of the study.

(i) Provide training 'refresher' for foundational MBAT course to trainers by master trainer: *Completed*

This task was completed and described in detail in the Y1 annual report.

(ii) Deliver MBAT-T practicum to trainers by master trainer: *Completed*

In Y1, the trainers were provided with a summary of the project and curriculum, and draft recordings of the primary MBAT guided practices, in preparation for the practicum scheduled to take place in Y2Q2.

- The practicum began in Y2Q2 and was delivered by the master trainer in three 2 to 2.5-hour sessions. Throughout the sessions, the trainers reviewed and discussed the materials and practices, and practiced the delivery of the MBAT-T program, including group exercises and guided mindfulness exercises.
- In Y2Q3, the trainers and master trainer met for an additional two 2.5-hour sessions. During these sessions, they completed a final review of the entire program, and engaged in discussions regarding the materials, practices, and implementation of the course. In addition, each trainer practiced the delivery of the MBAT-T program outside of the group sessions.

(iii) Evaluate trainers on their mindfulness teaching skills following the practicum:

Completed

During Y2Q2, the trainers were evaluated on their delivery of portions of the MBAT-T course, and consistently received feedback and support to address questions and areas of improvement. In Y2Q3, as the trainers gained a deeper understanding of the program and had an opportunity to practice delivery of the entire training; they were once again evaluated on their teaching skills and their understanding of the objectives of the training materials and were provided feedback by the master trainer. Trainers practiced delivery of the two programs and prepared their questions for the master trainer. The master trainer scheduled 30-minute sessions with each trainer to address their questions, and additional meetings to support preparation of the trainers prior to the beginning of the MBAT classes, as needed. The master trainer determined that all trainers were ready for delivery of the MBAT programs to soldiers in Round 1.

(iv) Provide trainers feedback on their mindfulness teaching skills: Completed

In Y2Q2, throughout the review of the MBAT-T program, the trainers discussed, delivered, and served as an audience for the delivery of various segments of the MBAT-T program. Trainers received feedback regarding their teaching skills and guidance on how to promote students' engagement in and understanding of the program's content. In Y2Q3, the master trainer provided additional feedback and guidance on their final delivery practice following the final booster sessions. Furthermore, the trainers, master trainer, and research team met throughout and upon completion of Round 1 to review the ongoing delivery experience and discuss observations and recommendations for successful delivery and implementation of the program during the current and future rounds of delivery.

**Task 6. Deliver the MBAT-T and MBAT-I programs to Soldiers over 2 Rounds: *In progress***

The planning and coordination of Task 6 was initiated during Y1, as described in detail in the Y1 Annual Report. During Y2, the sub-tasks of Round 1 were completed (see Appendix 1 for Study Calendar Overview), and the first sub-task of Round 2 was initiated, as described in detail below.

***Round 1: Completed***

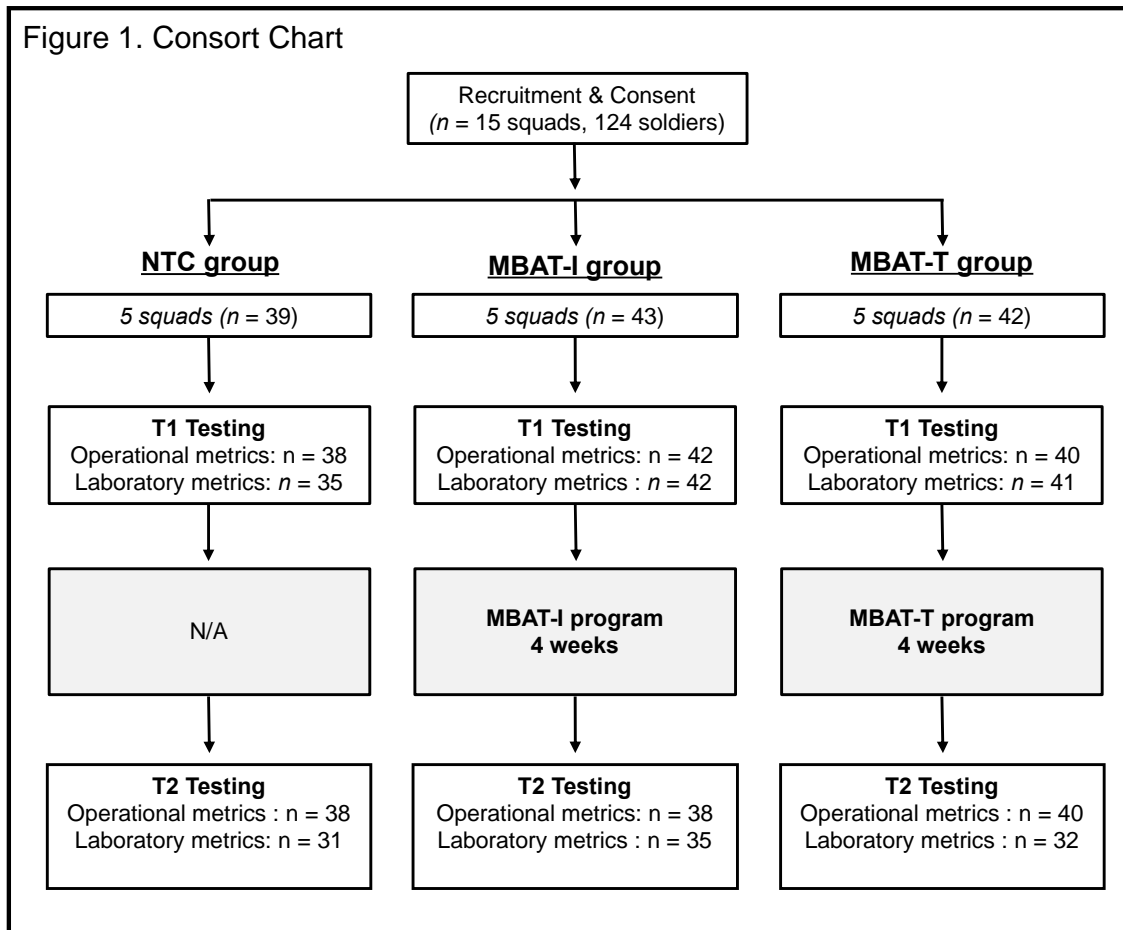
(i) Recruit, schedule and assign participants to the MBAT-T and MBAT-I programs:

*Completed*

- In Y2Q1, the research team met with the POC from the participating brigades of the 10<sup>th</sup> MTN division at Fort Drum to coordinate the implementation of the study protocol and identify the participating units to serve as our enrollment sample. During this quarter, the dates for the execution of both rounds, initially established in Y1, were adjusted by Brigade leadership at Fort Drum to begin May 2021 for Round 1.
- In Y2Q2 the research team continued coordination and planning of the project and made considerable progress in the scheduling and coordination of the different study's components, including the computer-based and operational testing sessions, and the delivery of the MBAT-T and MBAT-I programs. These efforts

were supported by the research team's continued coordination with the military leadership at Ft. Drum and the collaborating vendors involved in the delivery of the training (i.e., SAIC) and testing components (i.e., Conflict Kinetics). Furthermore, we identified the administrative point of contact at Fort Drum, CPT Luke Scudder, who assisted us with unit coordination and communication, tracking of participants' involvement in the study, and review of study materials. CPT Scudder provided us with the roster of the participating units, used by the research team to make progress in the assignments of participants to the three study conditions (i.e., No-Training Control or NTC, MBAT-I, MBAT-T). Assignment occurred at the level of the Squads, and the research team and military POCs on base met several times to coordinate the scheduling of squads according to their condition and involvement in the study. Finally, during this quarter, the P.I. connected with the leadership at Ft. Drum to debrief them on the study and its various components. Dr. Jha briefed COL Harris of Fort Drum 2BCT about the project and confirmed the required support of the units' leaders and participating brigades to ensure the successful implementation of the project. Furthermore, Dr. Jha briefed the behavioral health team members of Fort Drum MEDCOM about the study and secured their support, on an as needed basis. This meeting allowed us to consult the behavioral health team on the psychological resources sheet provided to the participants of the study at the beginning of the training.

- During Y2Q3, the research team continued coordination and planning of the project in collaboration with our POC at Ft. Drum: the plans for all aspects of the study were confirmed and finalized, all scheduling was completed, and the list of potential participants for Round 1 was finalized by the military leadership at Ft Drum. As the launch of the study approached, Dr. Jha briefed the squad-level leaders of the participating units at 2BCT, discussed the study's expectations and components, and answered questions regarding study participation.
- The team secured a roster of 15 squads, which were assigned evenly across the three conditions. Five squads were assigned to receive no training (i.e., NTC), and the remaining 10 squads were divided between the two MBAT conditions (i.e., MBAT-I, MBAT-T). The research team contacted the soldiers from the selected squads with information about the study and an invitation to participate in the study. A total of 124 soldiers from fifteen squads were consented and enrolled in the study for Round 1 (see Figure 1).



(ii) Deliver the MBAT-T to 5 squads (n = 50 soldiers) and MBAT-I to 5 squads (n = 50 soldiers): Completed

- This subtask was initiated and completed during Y2Q3. We delivered the two versions of the MBAT program to the 10 squads assigned to the training conditions: 5 squads were assigned to receive the MBAT-T program, and 5 squads were assigned to receive the MBAT-I program.
- The research team collaborated with the POC at Ft. Drum in the logistical planning and coordination of the MBAT delivery. Prior to study launch, they met on several occasions to develop the schedule for the classes, discuss the configuration of the classrooms, and various logistical aspects of the online delivery. These aspects were tested via meetings conducted within the selected classrooms, where the internet connection was tested, and the configuration of the classes were adjusted to allow for ease of communication between the soldiers and the trainers.
- The finalized schedule involved delivering 2-classes/week for each program, for a total of four classes delivered each week. Squads assigned to receive the MBAT-I program attended one of the two classes on Tuesday, and squads assigned to the MBAT-T attended one of the two classes on Wednesday. Morning classes involved three squads divided between two classrooms, whereas afternoon classes involved two squads gathered in a single classroom. Each squad attended one class per

week, for a total of four weeks. At least one member from the research team attended all classes to monitor and provide technical support as needed.

- Each trainer was assigned to deliver both MBAT-I and MBAT-T programs and engaged with every squad at least once. The research team met with the trainers individually prior to study launch to ensure their familiarity with the video conferencing platforms utilized for the delivery of the classes. The first round of meetings was scheduled the week prior to the launch of the classes, when trainers gained familiarity with the MS Teams platform utilized during weeks 1 and 2. The second round of meetings was scheduled during week 2, as we shifted to the Zoom platform to deliver the remaining classes. The research team, master trainer, and trainers met on a weekly basis to discuss the delivery of the two MBAT programs, provide feedback and suggestions, and discuss small adjustments to ensure engagement and successful delivery of the programs.
- Participants in both training conditions were provided access to the web-based measuring mindfulness app to support completion of the assigned out-of-class mindfulness practices. Soldiers were assigned one mindfulness practice a day, except for their assigned day of class and weekends. The app provided the recordings of the practices assigned for that week as well as additional practices that could be completed but not required by the program. Additionally, for each mindfulness practice via the app, they were presented with pre- and post-practice questions assessing their mood and stress level at that time. On the first day of class, soldiers were introduced to the app and prompted to sign-up if they hadn't done so already. In the following classes, participants were reminded to use the app and were given an opportunity to ask questions to the research staff attending the classes.
- All classes were delivered successfully and as planned, no rescheduling of classes was necessary, and most soldiers were in attendance to all classes.

## ***Round 2: Planning Phase***

(i) Recruit, schedule and assign participants to the MBAT-T and MBAT-I programs for

### ***Round 2: Initiated***

- During Y2Q2 and Y2Q3 the research team began coordination and planning of Round 2 via ongoing meetings with the POCs at Ft Drum. During this time, we learned that the collaborating 1BCT company at Ft Drum would be unavailable during the pre-established execution window for Round 2 (i.e., October 2021), due to training conflict in their scheduling calendar. The research team and military leadership identified the new six-week time window for execution of Round 2 (i.e., March 2022; 03/01/2021 - 04/08/2022).
- During Y2Q4 the research team continually met with the 1BCT military leadership to review various aspects of the study and next steps for coordination of Round 2. The POC at Ft Drum for Round 1, CPT Scudder, attended two of those meetings to provide insight on logistics and coordination of the project on the side of Ft. Drum. The research team will continue the planning and coordination of Round 2 with 1BCT by scheduling monthly meetings in the upcoming quarters.
- Additionally, during Y2Q4, we began the coordination of the trainers that will be participating in Round 2. Trainers were provided information about the prospective

schedule for Round 2, and adjustments made to the plan for delivery. We expect to make progress on this aspect in the upcoming quarter by confirming trainer's availability to participate in Round 2.

### **Task 7. Compare and contrast MBAT-T and MBAT-I programs: *In progress***

Progress for Round 1 is described in more detail below:

#### ***Round 1***

(i) Collect cognitive tasks and operational measures data before (T1) and after (T2) MBAT-T and MBAT-I courses from participants in the training groups ( $n = 100$ ) & (ii) from no-training participants ( $n = 50$ ): *Completed*

In Y2Q3 we collected the computer-based cognitive and self-reported data and the operational measures from participants in all three conditions (See Appendix 2 for the list of laboratory and operational metrics). Testing took place before (T1) and after (T2) the delivery of the MBAT-I and MBAT-T courses. For the online computer-based laboratory testing, participants were sent emails containing an individualized link to the testing session, and instructions for completing the testing session (e.g., complete in one-sitting, find a space free of distractions). For the operational testing, each squad was scheduled for an hour-long testing session to be completed in-person by the squad as an organic unit. At both time points, data were collected over the course of a week (see Figure 1. Consort Chart). In addition to laboratory and operational data collection, the web-based app allowed us to collect data related to practice engagement and impact. These practice-related data will be reviewed after finalizing the main set of analyses related to the T1-T2 data collection.

(iii) Perform interim analyses on Round 1 data: *In Progress*

In Y2Q3, after each testing time point, the research team stored the data and began the first round of data quality review. This entailed reviewing the data and carefully documenting testing completion for all participants. If any irregularities were found within the data during this initial review, the research team investigated these extensively and contacted the involved participants as needed. Then the data were stored, and analyses were initiated upon completion of Round 1. During Y2Q3 and Y2Q4, the research team conducted a rigorous data quality review. All data were prepared for formal data analysis. The data collected can be grouped under two categories: computer-based laboratory data & operational metrics data. T1 data analyses were finalized and reported below. T1-T2 data analyses will be performed to investigate group-by-time interactions in the upcoming quarters.

#### **Computer-based laboratory data (T1 data Analyses)**

After data collection at T1, computer-based laboratory data were cleaned, organized, and preliminary analyses were conducted. Preliminary analyses involved calculating basic descriptive statistics and conducting independent samples t-tests and ANOVAs to compare means across conditions (i.e., NTC, MBAT-I, MBAT-T).

- Demographics. We first reviewed participants' demographic information (e.g., age, gender) and differences across the three groups; no significant differences were identified across the demographic information collected in all three conditions (all  $p > .05$ , See Table 2).

**Table 2. Basic demographic characteristics**

	NTC	MBAT-I	MBAT-T	test statistic	<i>p</i>
<b>Age (in years)</b>	22.21 (2.38)	22.98 (4.43)	22.27 (4.07)	0.51	.605
<b>Gender</b>				7.67	.104
Female	0.00%	9.30%	2.38%		
Male	87.18%	86.05%	95.24%		
Prefer not to answer	0.00%	2.33%	0.00%		
Not reported	12.82%	2.33%	2.38%		
<b>Ethnicity</b>				6.50	.369
Hispanic or Latino	20.51%	23.26%	9.52%		
Not Hispanic or Latino	43.59%	41.86%	66.67%		
Other/Not Specified	12.82%	18.60%	16.67%		
Prefer not to answer	7.69%	9.30%	4.76%		
Not reported	15.38%	6.98%	2.38%		
<b>Race</b>				17.16	.248
American Indian or Alaskan Native	0.00%	4.65%	0.00%		
Asian	2.56%	0.00%	4.76%		
Black or African American	17.95%	20.93%	14.29%		
Native Hawaiian or Pacific Islander	2.56%	2.33%	0.00%		
White	48.72%	55.81%	73.81%		
More than one race	2.56%	4.65%	2.38%		
Other/Not Specified	5.13%	2.33%	2.38%		
Prefer not to answer	7.69%	6.98%	0.00%		
Not reported	12.82%	2.33%	2.38%		
<b>Education</b>				7.76	.652
High School Graduate	66.67%	74.42%	66.67%		
GED or equivalent	2.56%	4.65%	7.14%		
Some college, no degree	15.38%	13.95%	14.29%		
Associates Degree	2.56%	2.33%	4.76%		
Bachelors Degree	0.00%	0.00%	4.76%		
Prefer not to answer	0.00%	2.33%	0.00%		
Not reported	12.82%	2.33%	2.38%		

- Cognitive tasks. We reviewed participants' performance on the cognitive tasks at T1, across all groups. The baseline comparison between the NTC, MBAT-I, and MBAT-T groups did not reveal T1 differences for the main outcomes of the two cognitive tasks: SART ( $p > .05$ ). and WMDA ( $p > .05$ , see Table 3)
- Self-reported instruments. We investigated differences across groups on the self-reported measures (see Table 3). Baseline comparisons across the three groups indicated differences in one of the subscales of the Team Mindfulness Scale (TMS-ENP;  $p = .015$ ) and in Unit Cohesion (UC;  $p = .003$ ), with lower scores for participants in the NTC group compared to participants in both MBAT conditions.



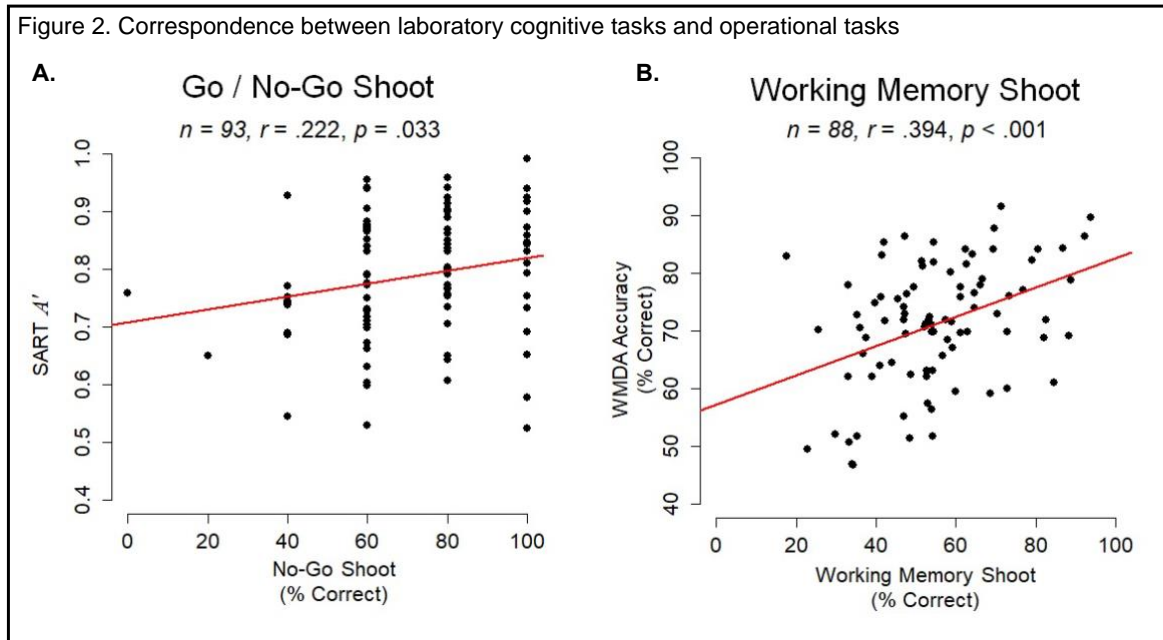
**Table 3. Basic descriptives and baseline differences across groups**

Tasks and Instruments (T1)	NTC			MBAT-I			MBAT-T			T1 statistics	
	N	Mean	SD	N	Mean	SD	N	Mean	SD	F	p
<b>Computer-Based Laboratory Metrics</b>											
<b>Cognitive Tasks</b>											
<b>SART</b>											
<i>A'</i>	28	0.77	0.12	33	0.78	0.10	38	0.81	0.10	1.36	.261
<i>ICV</i>	28	0.59	0.34	33	0.51	0.26	38	0.44	0.21	2.59	.081
<i>Probe 1</i>	28	1.65	0.72	33	1.48	0.75	38	1.61	0.82	0.41	.664
<b>WMDA</b>											
<i>Overall Accuracy</i>	21	0.71	9.97	30	0.71	10.16	36	0.74	9.14	0.61	.544
<i>Reaction Time</i>	21	951.92	210.54	30	952.64	223.83	36	1003.68	190.89	0.65	.527
<b>Psychological Well-Being</b>											
<i>Positive Affect (PA)</i>	34	16.50	4.14	42	16.31	4.16	41	17.34	3.55	0.79	.458
<i>Negative Affect (NA)</i>	34	7.26	2.09	42	8.31	3.34	41	8.39	2.69	1.82	.166
<i>Depression &amp; Anxiety (PHQ-4)</i>	34	1.24	1.81	42	1.69	2.49	41	1.90	2.40	0.82	.444
<i>Perceived Stress (PSS-4)</i>	34	4.76	2.58	42	4.60	3.10	41	4.98	2.48	0.20	.820
<i>PTSD (PCL-5)</i>	33	0.45	1.03	41	0.46	1.19	41	0.44	0.95	0.01	.995
<b>Mindfulness</b>											
<i>Decentering (EQD)</i>	33	43.48	7.71	42	45.12	9.62	41	44.07	7.32	0.38	.687
<i>Mindfulness (FFMQ-15)</i>	33	50.85	5.76	42	51.29	9.06	41	51.76	6.03	0.15	.865
<i>Team mindfulness (TMS)</i>	34	45.56	8.25	41	48.17	10.29	41	50.17	8.72	2.35	.100
<i>TMS - PFA</i>	34	23.26	5.58	41	24.02	6.64	41	24.68	5.43	0.53	.589
<i>TMS - ENP</i>	34	22.29	4.48	41	24.15	5.13	41	25.49	4.33	4.36	.015
<b>Interpersonal &amp; Team Experience</b>											
<i>WEIPS - Self-Awareness</i>	34	4.84	1.46	41	5.01	1.79	40	5.09	1.33	0.26	.773
<i>WEIPS - Self-Management</i>	34	5.83	0.95	41	5.87	1.14	41	6.15	0.72	1.26	.287
<i>WEIPS - Other-Awareness</i>	34	5.32	1.08	41	5.30	1.24	41	5.63	0.89	1.20	.305
<i>WEIPS - Other-Management</i>	34	5.21	1.11	41	5.40	1.08	41	5.16	1.01	0.53	.587
<i>Unit Cohesion</i>	34	3.78	0.98	42	4.25	0.71	41	4.38	0.57	6.19	.003
<i>Situation Monitoring</i>	34	4.01	0.54	42	3.88	0.77	41	3.96	0.53	0.40	.668
<b>Operational Metrics</b>											
<b>Combat Arms Performance &amp; Marksmanship &amp; Reaction Times</b>											
<i>SKP 7M, 50M, 100M</i>	37	92.28	11.24	42	88.53	13.09	39	91.58	12.17	0.97	.382
<i>SK 7M, 50M</i>	37	92.03	9.51	42	91.64	9.01	39	92.56	8.81	0.24	.788
<i>SP 7M, 100M</i>	37	91.12	11.46	42	89.13	11.43	39	92.58	11.18	0.96	.386
<i>Table V Score</i>	37	21.38	7.98	42	22.45	6.41	39	23.85	6.16	1.35	.265
<i>Low-Ready RT (sec.)</i>	37	1.75	1.54	42	1.45	0.58	39	1.48	0.71	1.05	.353
<i>Ready RT (sec.)</i>	37	0.85	0.87	42	0.69	0.40	39	0.56	0.22	2.70	.071
<i>Visual Detection Shoot</i>	36	55.74	21.39	38	57.54	19.39	39	54.19	24.14	0.23	.796
<b>Go / No Shoot</b>											
<i>Go accuracy</i>	36	0.84	0.12	42	0.69	0.24	39	0.74	0.24	5.25	.007
<i>No-Go accuracy</i>	36	0.66	0.19	42	0.71	0.21	39	0.76	0.20	2.45	.091
<b>WM Shoot</b>	37	53.92	17.33	42	53.17	11.78	39	57.78	18.20	1.19	.308

## Operational metrics data

- After data collection at T1, simulated operational performance data were cleaned, organized, and preliminary analyses were conducted. Preliminary analyses involved calculating basic descriptive statistics and conducting independent t-tests and ANOVAs to compare means across conditions. Two participants were excluded from these initial analyses because they had a current injury that impacted their performance or did not bring corrective lenses to the assessment session. Groups did not differ on the majority of operational performance tasks ( $p > .05$ ). There was one measure that showed significant ( $p = .007$ ) differences between groups: the NTC group had significantly greater accuracy for “go” targets during the go / no-go shoot task than both MBAT groups at T1 (see Table 3. Basic descriptive statistics and baseline differences across conditions).

- Initial correlations were also examined between operational performance measures and computer-based cognitive task performance measures. We found that cognitive performance as assessed on our computer-based cognitive tasks were predictive of performance on simulated operational tasks. Specifically, SART performance (A') was significantly correlated with no-go shoot accuracy ( $n = 93$ ,  $r = .222$ ,  $p = .033$ ; Figure 2.A), and WMDA accuracy was significantly correlated with accuracy on the Working Memory Shoot task ( $n = 88$ ,  $r = .394$ ,  $p < .001$ ; Figure 2.B). This suggests that cognitive abilities assessed in the laboratory have potential real-world importance for operational activities in Soldiers.



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

*If the project was not intended to provide training and professional development opportunities or there is nothing significant to report during this reporting period, state "Nothing to Report."*

*Describe opportunities for training and professional development provided to anyone who worked on the project or anyone who was involved in the activities supported by the project. "Training" activities are those in which individuals with advanced professional skills and experience assist others in attaining greater proficiency. Training activities may include, for example, courses or one-on-one work with a mentor. "Professional development" activities result in increased knowledge or skill in one's area of expertise and may include workshops, conferences, seminars, study groups, and individual study. Include participation in conferences, workshops, and seminars not listed under major activities.*

During this reporting period, training and professional development opportunities have been offered informally and on an ad hoc basis to post-doctoral, graduate students, and research-associate members of the PI's lab via discussions with the PI over the first two years of the project. Lab members have learned different aspects of the scientific process, including the types of planning and preliminary procedures involved in successfully conducting a research study. Specifically, lab members have been exposed to procedures involved in IRB preparation and submission, study design, battery preparation and programming, logistical coordination with consultants and the partnering military installation, preparing and delivering offsite data collection, and analysis of collected data. The group discussions at regular lab meetings regarding this project have offered trainees an opportunity to be exposed to areas of key importance in preparation for doctoral studies and for careers in research.

### **How were the results disseminated to communities of interest?**

Nothing to report.

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

During the next quarter, we aim to complete the following tasks:

- Data Analysis of MBAT-I and MBAT-T data, including:
  - Continue interim analyses of Round 1 data, including review and integrations of T2 data, and comparison of groups over time (i.e., T1 & T2 data)
  - Schedule internal meetings to review results and discuss implications
  - Compile and begin analyses of app data regarding practice engagement.
- Make progress on the coordination of Round 2 delivery, including:
  - Schedule meetings with 1BCT POC/leadership to continue coordination of Round 2
  - Schedule rooms and materials required for testing and training delivery of Round 2 at Ft Drum
  - Coordinate and schedule trainers to be involved in MBAT delivery in Round 2
  - Hold internal meetings with the research team to review delivery of Round 1 and discuss possible adjustments needed for Round 2

**4. IMPACT:**

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

Nothing to report.

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

Nothing to report.

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

Nothing to report.

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

Discussions with military project advisors and sharing of training materials with military leadership and advisors, as part of the work of this project, has led to a number of broader impacts within the military. As one consequence of these advisory meetings, GEN Funk, commanding officer of the U.S. Army Training and Doctrine Command (TRADOC), and members of the Walter Reed Army Institute of Research (WRAIR), have initiated a large-scale research project. This collaboration between TRADOC and WRAIR seeks to investigate the effects of MBAT in the context of U.S. Army Basic Training, which has the potential to have a broad and lasting influence on the U.S. Army.

## **5. CHANGES/PROBLEMS:**

### **Changes in approach and reasons for change**

*Nothing to report.*

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

Due to the COVID19 pandemic, associated University furloughs and DOD scheduling shifts, we anticipated delays and adjusted plans to resolve challenges.

#### **1. Contracting:**

- Challenges: Some of the aspects that depend on approval from the University of Miami (e.g., approval of contracts and IRB review) took longer than expected given continued staff furlough and other COVID-related delays. For example, delays in the contracting of the App development company had an impact on the initiation of work on the App.
- Solutions: To account for the delay, in Y2Q1 the research team worked closely with various UM departments to minimize delays and completed an internal piloting of the App's functions over the holiday break to provide the app development team with compiled feedback for adjustments.

## **2. Testing:**

- Challenges: Given that no in-person research activities were allowed by the University during the Y2 period, we worked on transferring all computer-based laboratory testing to an online testing platform.
- Solutions: We were proactive in programming the laboratory testing battery for online testing using the software Inquisit for data collection and performed piloting to ensure the quality of data collected remotely.

## **3. Web-based App:**

- Challenges: We experienced delays in the finalization of the app due to setbacks and technical errors on the side of the app development company.
- Solutions: Throughout Y2Q1 and Y2Q2, the research team provided substantial support in reviewing the app's functionality and identifying issues, as well as meeting with the App development team on a weekly basis to provide feedback and check on the status of the required adjustments. On several occasions, the PI contacted the CEO of the app company to discuss delays and issues as they occurred, and to ensure that future deadlines would be met and that the app's finalization would be given priority in their internal operations. The delays of the development of the app did not have an impact on the timely launch and delivery of the project.

## **4. Round 2 Coordination**

- Challenges: In Y2Q3, as we made progress on the coordination of Round 2, we learned that the collaborating company 1BCT at Ft. Drum had a training conflict that would not allow us to deliver Round 2 during the previously selected time window. This required moving the execution of Round 2 to Y3Q2 and Y3Q3.
- Solutions: Through consistent communication with the POCs and military leadership at Ft Drum, we have currently identified a new six-week project execution window for Round 2 (i.e., March 2022; 03/01/2021 - 04/08/2022). Given the delay from the initially proposed timeline, we will need to request a no-cost extension to be able to finalize data analysis and disseminate results once Round 2 data have been collected. In addition, the initial review of the Round 1 data indicated lower engagement rates for the T2 computer-based testing sessions relative to T1. The research team is currently discussing a plan for in-person data collection for Round 2. The POC at 1BCT confirmed that in-person testing should be permissible during that time given the current Ft. Drum COVID-19 guidelines. As the research team continues to coordinate for in-person testing during Round 2, we will monitor the COVID-19 situation to ensure the feasibility of this plan and will revert to online testing plans if needed.

## **Changes that had a significant impact on expenditures**

As stated above, the COVID-19 pandemic had an impact on hiring, travel, and contract approval at the University of Miami. This explains the lower actual expenditure for Y2 compared to what was initially budgeted. For Round 2, we are planning to conduct training

and data collection in person, which will require travel expenditures for trainers and research staff involved in the study delivery. In addition, given the delay in the initially proposed timeline for Round 2, we anticipate requesting a no-cost extension to cover the effort for data analysis and dissemination.

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

**Significant changes in use or care of human subjects**

*Nothing to report.*

**Significant changes in use or care of vertebrate animals**

*Nothing to report.*

**Significant changes in use of biohazards and/or select agents**

*Nothing to report.*

**6. PRODUCTS:**

- **Publications, conference papers, and presentations**  
Nothing to report  
**Journal publications.**  
Nothing to report  
**Books or other non-periodical, one-time publications.**

Nothing to report

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

Nothing to report

- **Website(s) or other Internet site(s)**

Nothing to report

- **Technologies or techniques**

Nothing to report

- **Inventions, patent applications, and/or licenses**

Nothing to report

- **Other Products**



*Nothing to report.*

## **7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS**

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

<i>Name:</i>	Amishi P. Jha
<i>Project Role:</i>	P.I.
<i>Nearest person month worked:</i>	1.5 person months per quarter
<i>Contribution to Project:</i>	Dr. Jha has provided oversight and leadership on this project. She has provided several briefs to military leadership. She was involved in securing the site of the project and coordinating all ongoing tasks.
<i>Name:</i>	Scott Rogers
<i>Project Role:</i>	Co-Investigator
<i>Nearest person month worked:</i>	1 person month per quarter
<i>Contribution to Project:</i>	Scott Rogers is involved in the refinement of the MBAT Individual program and the development of the MBAT Team program. He has been playing a key role in the coordination with the app development team regarding the content of the app and was involved in the delivery of the MBAT boosters and practicum trainings.
<i>Name:</i>	Ekaterina Denkova
<i>Project Role:</i>	Co-Investigator
<i>Nearest person month worked:</i>	2 person months per quarter

*Contribution to Project:*

Dr. Denkova has performed work in the area of securing IRB/HRPO approvals, submitting the pre-registration of the study to [clinicaltrials.gov](https://clinicaltrials.gov), engaging in discussions regarding the app and coordinating the logistics of the project as well as leading the selection, programming and data collection of the computer-based metrics.

*Name:*

Anthony Zanesco

*Project Role:*

Post-doctoral fellow

*Nearest person month worked:*

3 person months per quarter

*Contribution to Project:*

Dr. Zanesco has been involved in the development of the operational metrics (i.e., Conflict Kinetics), providing support for the coordination of the study and data collection of operational metrics, and data analysis on portions of the collected data.

*Name:*

Jordan Barry

*Project Role:*

Research Associate

*Nearest person month worked:*

2 person months per quarter

*Contribution to Project:*

Mr. Barry has provided support in the preparation of IRB submission, registration to [clinicaltrials.gov](https://clinicaltrials.gov), gathering of information to facilitate the development of training courses and the mobile app, programming the online testing battery, sending the online testing links, overseeing data collection, and data analysis on portions of the collected data.

*Name:*

Costanza Alessio

*Project Role:*

Research Associate

*Nearest person month worked:*

1 person month per quarter

*Contribution to Project:*

Ms. Alessio has provided support in the preparation of IRB submission, registration to [clinicaltrials.gov](https://clinicaltrials.gov), gathering of information to facilitate the development of training courses and the mobile app, coordinating meetings, tracking action items, assisting with data collection, providing support in the delivery of the trainings, coordinating delivery and scheduling of the project, and

data analysis on portions of the collected data.

*Name:*

Kellen McDonald

*Project Role:*

Research Associate

*Nearest person month worked:*

1 person month per quarter

*Contribution to Project:*

Ms. McDonald has provided support in the coordination and development of the mobile app.

*Name:*

Cody Boland

*Project Role:*

Graduate Student

*Nearest person month worked:*

1 person month per quarter

*Contribution to Project:*

Ms. Boland has provided support in the coordination and development of the mobile app.

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

In October 2020, the contract for a new DOD grant was finalized. As such, the effort for the PI and key personnel was distributed to account for these changes.

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

**Organization Name:**

Fort Drum, 10<sup>th</sup> Mountain Division

**Location of Organization:**

10000 10<sup>th</sup> Mountain Division Drive, Fort Drum, NY 13602

**Partner's contribution to the project:**

Fort Drum is a U.S. Army military installation. It generates, rapidly deploys, and sustains ready forces to meet national security requirements while caring for Soldiers, Families, and civilians. Ft. Drum is a collaborating organization on this project by providing project coordination with the research team for aspects of the study taking place at Ft. Drum, and for facilitating recruitment of participants. Ft. Drum will also provide facilities and locations for the testing and MBAT training, and the installation of the simulated operational scenario environment.

**8. SPECIAL REPORTING REQUIREMENTS****COLLABORATIVE AWARDS:****QUAD CHARTS:**

## Mindfulness-based Attention Training to Bolster Small Team Performance

Log Number: 180178

Award Number: W81XWH1920064



PI: Dr. Amishi P. Jha

Org: University of Miami

Award Amount: \$2,318,318

### Study/Product Aim(s)

The overarching aim of this proposal is to develop, deliver, and investigate the efficacy of MBAT-Team (vs. MBAT-I) as a tool to promote individual cognitive performance, resilience, interpersonal interactions and team-level operational performance.

### Approach

Main Components:

1. Develop MBAT-Team
2. Deliver MBAT-Team Practicum to trainers
3. Develop MBAT app
4. Deliver MBAT-Team and MBAT-Individual to squads
5. Collect lab and operational measures from squads

We completed all tasks expected to be finalized in Year 2, as outlined in the Statement of Work. Key tasks are described below:

- Prepared and submitted a protocol amendment and continuing review to the IRB at the University of Miami, which were reviewed and approved by IRB and HRPO
- Finalized the development of all training materials,
- Conducted several rounds of internal review of all materials, also reviewed by advisory team and military leadership.
- Developed a web-based app for mindfulness exercises.
- Coordinated, and delivered a pilot study with ROTC cadets to test the App.
- Delivered the teaching practicum to trainers
- Planned and coordinated the delivery of Round 1 with the military leadership and participating unit liaisons at Ft. Drum.
- Assigned 15 squads to 3 conditions: 1. No training group (5 squads), 2. MBAT-Individual (5 squads) and MBAT-Team (5 squads)
- Delivered MBAT-I to 5 squads and MBAT-T to 5 squads
- Collected computer-based and operational metrics from all 15 squads before (T1) and after (T2) a 4-week interval
- Worked on interim analyses for T1 Round 1 data
- Initiated planning and coordination of Round 2 with 1BCT at Ft. Drum

### Timeline and Cost

Activities	CY	19	20	21	22
Secure IRB approval and pre-registration					
Finalize assessment measures					
Prepare and develop training materials					
Develop and Pilot Mobile Application (App)					
Deliver mindfulness practicum to trainers					
Deliver the MBAT-T and MBAT-I					
Compare and contrast MBAT-T and MBAT-I					
Disseminate results					
Estimated budget per year			\$662,805	\$873,214	\$782,299

### Goals/Milestones

**CY20 Goal** – Preparation of testing and training materials

☒ Secure IRB approval and pre-registration

☒ Finalize assessment measures

☒ Prepare and develop training materials

**CY21 Goals** – App development and Teaching Practicum

☒ Develop and Pilot Mobile Application (App)

☒ Deliver mindfulness practicum to trainers

**CY22 Goal** – Deliver MT, collect and analyze data

☒ Deliver the MBAT-T and MBAT-I for Round 1

☐ Compare and contrast MBAT-T and MBAT-I

☐ Disseminate results

**Comments/Challenges/Issues/Concerns:** Per collaborating military institution, Round 2 has been delayed by a few months.

### Budget Expenditure to Date

Projected Expenditure: \$1,536,019 Actual Expenditure: \$911,126

Updated: University of Miami, October 2021

## 9. APPENDICES:

## Appendix 1 Round 1 Training and Testing Calendar

May 2021						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
26	27	28	29	30	May 1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
T1 Conflict Kinetics Testing & Computer-based Testing						
24	25	26	27	28	29	30
WEEK 1	MBAT-I classes • 9:30–11:30 (3 squads) • 13:00–15:00 (2 squads)	MBAT-T classes • 9:30–11:30 (3 squads) • 13:00–15:00 (2 squads)				
MMA ENGAGEMENT						
June 2021						
31	Jun 1	2	3	4	5	6
WEEK 2	MBAT-I classes • 9:30–11:30 (3 squads) • 13:00–15:00 (2 squads)	MBAT-T classes • 9:30–11:30 (3 squads) • 13:00–15:00 (2 squads)				
MMA ENGAGEMENT						
7	8	9	10	11	12	13
WEEK 3	MBAT-I classes • 9:30–11:30 (3 squads) • 13:00–15:00 (2 squads)	MBAT-T classes • 9:30–11:30 (3 squads) • 13:00–15:00 (2 squads)				
MMA ENGAGEMENT						
14	15	16	17	18	19	20
WEEK 4	MBAT-I classes • 9:30–12:00 (3 squads) • 13:00–15:30 (2 squads)	MBAT-T classes • 9:30–12:00 (3 squads) • 13:00–15:30 (2 squads)				
MMA ENGAGEMENT						
21	22	23	24	25	26	27
T2 Conflict Kinetics Testing & Computer-based Testing						
28	29	30	Jul 1	2	3	4

### LEGEND

- Recruitment
- Participant Testing
- MBAT Classes
- Measuring Mindfulness Application (MMA)

## Appendix 2 Measures Index

Tasks and Instruments	Measure of ...	Score Interpretation
<b>Computer-Based Laboratory Metrics</b>		
<b>Cognitive Tasks</b>		
<i>SART</i>		
<i>A'</i>	Attentional accuracy	↑ score, greater attentional performance
<i>ICV</i>	Variability in RT and attentional instability	↑ score, greater attentional instability
<i>Probe 1</i>	Self-reported mind wandering	↑ score, greater mind wandering
<i>Probe 2</i>	Self-reported content of mind wandering	categorical measure of content
<i>WMDA</i>		
<i>Overall Accuracy</i>	WM accuracy	↑ score, greater WM performance
<i>RT</i>	RT on correct trials	↑ score, slower identification of old vs. new items
<b>Psychological Well-Being</b>		
<i>PA</i>	Positive mood	↑ score, greater positive affect
<i>NA</i>	Negative mood	↑ score, greater negative affect
<i>PHQ-4</i>	Anxiety & Depression	↑ score, greater experience of anxiety/depression
<i>PSS-4</i>	Perceived stress	↑ score, greater perceived stress
<i>PCL-5</i>	PTSD symptoms	↑ score, greater experience of PTSD symptoms
<b>Mindfulness</b>		
<i>EQD</i>	Decentering	↑ score, greater decentering in information processing
<i>FFMQ15</i>	Mindful processing	↑ score, greater mindful processing across five areas
<i>TMS</i>	Team mindfulness	↑ score, greater experienced team mindfulness
<i>AMPS</i>	Applied mindful processing	↑ score, greater mindfulness in everyday cognitive processing
<b>Interpersonal &amp; Team Experience</b>		
<i>WEIPS</i>	Team emotional intelligence	↑ score, greater experienced team mindfulness
<i>Unit Cohesion</i>	Unit cohesion	↑ score, greater experienced team cohesion
<i>Situation Monitoring</i>	Situation monitoring	↑ score, greater perceived team ability to monitor situations
<b>Operational Metrics</b>		
<b>Reaction Time</b>		
	RT from Low-Ready Position	↑ score, slower response time
	RT from Ready Position	↑ score, slower response time
<b>Combat Arms Performance &amp; Marksmanship</b>		
	7M, 50M, & 100M with Movement (SKP)	↑ score, greater shooting accuracy
	Table V M4 Qualification	↑ score, greater shooting accuracy
<b>Decision Making</b>		
	Visual Detection Shoot	↑ score, greater task accuracy
<b>Cognitive Performance</b>		
	Shoot / Don't Shoot	↑ score, greater task accuracy
	Working Memory Shoot	↑ score, greater task accuracy
<b>Team Operational Performance (T2)</b>		
	Team Shooting Drill	↑ score, greater shooting accuracy

# PHS Inclusion Enrollment Report

## PHS Inclusion Enrollment Report

This report format should NOT be used for collecting data from study participants.

OMB Number: 0925-0001

Expiration Date: 3/31/2020

\*Study Title  
(must be  
unique):

**Mindfulness-based Attention Training to Bolster Small Team Performance**

\* Delayed Onset Study? ☐ Yes ☒ No

If study is not delayed onset, the following selections are required:

Enrollment Type ☒ Planned ☐ Cumulative (Actual)

Using an Existing Dataset or Resource ☐ Yes ☒ No

Enrollment Location ☒ Domestic ☐ Foreign

Clinical Trial ☒ Yes ☐ No

NIH-Defined Phase III Clinical Trial ☐ Yes ☒ No

Comments:

The demographics distribution of this sample was compared to the expected demographic distributions provided by the 2BCT Battalion. The distribution of our sample was aligned with the expected distribution according to the data provided by 2BCT.

Racial Categories	Ethnic Categories									
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			Total
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/ Alaska Native	1	0	0	0	1	0	0	0	0	2
Asian	0	1	0	0	0	0	0	2	0	3
Native Hawaiian or Other Pacific Islander	0	1	0	0	0	0	0	1	0	2
Black or African American	0	10	0	0	4	0	1	7	0	22
White	2	46	0	1	11	0	0	14	0	74
More than One Race	0	2	0	0	0	0	0	2	0	4
Unknown or Not Reported	0	0	0	0	5	0	0	4	8	17
Total	3	60	0	1	21	0	1	30	8	124

Report 1 of 1