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THE EXAMINATION OF A MOBILE APPLICATION FOR THE REDUCTION OF
POSTTRAUMATIC STRESS-RELATED SYMPTOMS IN EMERGENCY DISPATCHERS

by

EMY A. WILLIS
B.A. Hawaii Pacific University, 2010

A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Science
in the Department of Psychology
in the College of Sciences
at the University of Central Florida
Orlando, Florida

Spring Term
2019

Major Professor: Deborah C. Beidel

ABSTRACT

Emergency dispatchers report that their jobs are stressful, yet there are few controlled investigations examining their specific psychological complaints. Additionally, research examining the use of interventions directed at alleviating their work-related stress is limited. This study aims to examine the efficacy and feasibility of a mobile application (PTSD Coach) on various indicators of psychosocial well-being among emergency telecommunicator dispatchers. A sample of 117 emergency dispatchers completed self-report psychological mood assessments at baseline, weekly for five weeks during PTSD Coach use and post-treatment. Participant report of psychological symptoms showed statistically significant decreases in mood severity over the period of one month.

ACKNOWLEDGMENTS

I would like to acknowledge the guidance and assistance provided by my committee, Drs. Deborah C. Beidel, Sandra M. Neer, and Clint Bowers.

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LIST OF ACRONYMS/ABBREVIATIONS

ASD	Acute Stress Disorder
AUDIT	Alcohol Use Disorders Identification Test
DAR-5	Dimensions of Anger Reactions 5
E-Heath	Electronoic Health
GAD-7	Generalized Anxiety Disorder Scale 7
IPF	Inventory of Psychosocial Functioning-brief
LEC-5	Life Events Checklist
MD	Major Depression
PHQ-9	Patient Health Questionnaire Depression Subscale 9
PCL-5	PTSD Checklist 5
PTSD	Posttraumatic Stress Disorder
SUDS	Subjective Units of Distress Scale

CHAPTER 1: INTRODUCTION

1.1 First Responder

First responders include rescue disaster workers, paramedics, medical personnel in emergency departments, firefighters, police officers and emergency dispatchers. They serve an integral role in protecting the community and preserving the continuity of critical community functions. First responders are deployed to various emergencies that may vary in severity but include medical emergency, structural fire, fatal motor vehicle accident, natural disaster, or child/domestic violence, depending on their area of service (Ben, Scotti, Chen, & Fortson, 2006; Corneil, Beaton, Murphy, Johnson, & Pike, 1999; Haugen, Evces, & Weiss, 2012). On a daily basis, they must be prepared to sacrifice their lives in situations where community members would be expected to flee and escape (Lucas & Kline, 2008). Some first responders typically respond to these life-threatening conditions more than once per day (Ben et al., 2006). With every dispatch, they risk exposing themselves to potentially traumatic events. Research suggests first responders may encounter hundreds of potentially traumatic events over the course of their careers (Meyer et al., 2012).

One often overlooked group of first responders who assist the men and women on the frontlines is emergency telecommunication dispatchers. Emergency telecommunicators must quickly assess incoming emergency situations to secure the scene and dispatch appropriate help. Coordination in response to emergency situations while being physically distant from the

situation requires the ability to remain calm, and problem-solve in a high-pressure environment. While emergency telecommunicators are not visually in contact with the emergency situations, they are responsible for sending other first responders to dangerous environments. Emergency telecommunicators also provide psychological support to individuals on the other end of the telephone line without having direct control over the situation. Similarly to other first responders, they are continuously exposed to high-stress situations across their workday. Considering the frequency, nature, and intensity of duty-related traumatic exposures, understanding the impact these traumatic events have on the health of emergency telecommunicators is of utmost importance.

There is a broad range of long-term physical and mental health consequences as a result of work-related potential traumatic exposures (Benedek, Fullerton, & Ursano, 2007; Pierce & Lilly, 2012). In one year, an estimated 8.1 of every 100 first-responders will suffer an injury or illness and are required to take a leave of absence. In fact, the missed work due to illness is seven times greater among first responders, relative to the national average (Levine, 2016). Physiological illnesses due to occupational related stress include high blood pressure and cardiovascular disease which also increases the illness rate (Violanti et al., 2006, 2013). For emergency telecommunicators, the stress brought on by repeated exposure to traumatic calls causes significant levels of fatigue which puts these individuals at considerable risk for burnout, workplace injury, sick leave or disability (Pierce & Lilly, 2012).

The psychological cost of exposure to potential traumatic events are even more abundantly evident. Mental fatigue due to work-related injuries and illnesses in these professionals costs over one million dollars (Fullerton, Ursano, & Wang, 2004). First responders frequently experience an array of emotional and behavioral disturbances such as distress, worry, disturbed sleep or concentration, anger outbursts, difficulties with interpersonal relationships, increase in substance use, somatization, anxiety, and depression (Benedek, Ursano, Fullerton, Vineburgh, & Gifford, 2006). Common mental health complaints among first responders include Acute Stress Disorder (ASD), acute and chronic Posttraumatic Stress Disorder (PTSD), and Major Depression (MD) (Jones, 2017). However, numerous first responders remain undiagnosed but may have subclinical levels of PTSD. Subclinical PTSD is defined by symptoms insufficient in number, distribution, or severity to meet full criteria (McLaughlin, Nielsen, & Waller, 2008). Twenty-five percent of those who display subclinical PTSD symptoms go on to develop PTSD (Cukor, Wyka, Jayasinghe, & Difede, 2010; Smid, Mooren, van der Mast, Gersons, & Kleber, 2009). Based on the few studies that have examined the rates of PTSD in North American emergency dispatchers, between 9 to 30 percent showed PTSD symptoms (Dicks, 2014; Lilly & Allen, 2015), which is much higher than the roughly 4% prevalence rate found among the general U.S. population (Department of Health and Mental Hygiene [DOHMH], 2007). Hence, early intervention is crucial to reducing the prevalence of stress-related disorders in the emergency dispatchers.

With such a high prevalence rate of mental health disorders in first responders, why are they not seeking treatment? While services such as employee assistance programs are available,

there is a lack of mental health utilization among first responders. Individuals are hesitant to request treatment due to the cultural stigma surrounding help-seeking behaviors. There is a sense of criticism toward utilization of mental health treatment, producing a significant barrier to care (Houdmont, Leka, & Sinclair, 2012). First responders who suffered from a psychiatric condition were much more likely to be viewed negatively by their peers than if they suffered from a physical condition (Royle, Keenan, & Farrell, 2009). First responders may also resist acknowledging a need for mental health services as they may have previously judged others who are suffering from stress as failures (Henderson, Van Hasselt, LeDuc, & Couwels, 2016). Additionally, first responders operate on shift schedules which may make scheduling appointments difficult. These barriers to care might be overcome through the use of innovative methods of mobile technology such as a smartphone. The mobile device opens the opportunity for those who would not typically seek care due to stigma, geographic restrictions, or time commitment.

1.2 Mobile Technologies

E-Health, also known as electronic health, is the integration of technology into health care, including numerous interactive digital modalities such as online, telehealth and smartphones. In mental health, computer-based monitoring, psychoeducation, and therapy programs have been developed for depression, anxiety disorders, sleep disorders, and PTSD (Christensen & Griffiths, 2002).

The evolutionary growth of mobile technologies, such as smartphones, has brought an increasing focus on specialized e-Health modalities known as mobile health or m-Health. There are over 3.2 billion unique mobile users worldwide (Steinhubl, Muse, & Topol, 2013). Modern mobile devices such as smartphones, are light-weight, easy to operate and have a wide variety of purposes. Mobile applications are well suited for health information dissemination as an individual can inconspicuously manage their mental health needs without judgment. Individuals can choose an application based on their mental health needs and tailor the applications towards managing their specific symptoms and level of severity.

One such intervention that has successfully translated into a smartphone application is a form of cognitive behavioral therapy (CBT) known as, stress inoculation training (Serino et al., 2014). Past studies have suggested stress inoculation training as an effective treatment for PTSD and anxiety disorders in mobile application format (Serino et al., 2014). The general objectives of stress inoculation training includes (1) educational component which allows for an individual to become aware of their psychological stressors, (2) introduction of practical coping skills for the stressor and allow for the acquisition of and rehearsal of those techniques, and (3) the application of the acquired skills in daily life. Smartphone applications offer a platform for CBT-based interventions such as relaxation exercises, calming self-talk, and self-coaching to be introduced and practiced in real time when the symptoms arise.

1.3 Clinical Implications

By introducing psychoeducation and coping skills through mobile applications, first responders can find resources and help that they need in the comfort of their home or perhaps

even during a break at work. Specifically, for telecommunication dispatchers, a short time between calls can provide a precious moment for relaxation. Emotional and behavioral disturbances such as anger outbursts and sleep difficulties (often experienced by first responders) overlap significantly with the symptoms of subclinical PTSD and other stress-related disorders. As a result of the prevalence of PTSD symptoms reported by first responders, using a mobile application designed to treat PTSD may be an appropriate intervention for first responders. The PTSD Coach mobile application, initially designed for veterans, helps individuals learn to manage symptoms of PTSD and other stressors (Owen et al., 2015). PTSD Coach was designed either as a stand-alone psychoeducation and self-management tool or as an adjunctive tool to more traditional treatment. Similar to stress inoculation training, PTSD coach (1) concisely provides psychoeducation of PTSD symptoms, (2) enables remote practice of stress reduction strategies through mobile interface, and (3) provides direction and mood tracking through charting of subjective units of distress (SUD) for each targeted activity. A randomized clinical trial for PTSD Coach was reported to be effective in reducing PTSD symptoms by 47 percent compared to 26 percent in the waitlist group within the military population (Kuhn et al., 2017).

There is research supporting similarities in the trauma experienced by first responder and military personnel (Papazoglou, 2017; Walker, McKune, Ferguson, Pyne, & Rattray, 2016). Both groups experience trauma and loss as they perform their job responsibilities, and many experience multiple traumas over the course of their career. Emergency telecommunicators also experience traumatic events first hand through the calls that they receive. Other similarities include the culture of stigma and symptom minimization which fuels both populations reluctance to seek treatment (Papazoglou, 2017). The parallels between the military population and first

responders in barriers to care and symptom presentation suggest that the PTSD coach mobile application is a viable alternative for treatment for first responders.

Thus far, very few studies have explored the acceptability, feasibility and the efficacy of the use of the mobile application for stress symptom reduction with first responders. This study aims to examine the acceptability, feasibility, and efficacy of PTSD Coach on various indicators of psychosocial well-being among emergency telecommunication dispatchers. It is hypothesized that psychosocial symptoms will decrease after the introduction and use of the PTSD Coach mobile application.

CHAPTER 2: METHOD

2.1 Participants

One hundred- seventeen (117) participants ranging in age from eighteen to fifty-nine were recruited in person from attendees at the 2018 NAVIGATOR emergency dispatcher conference. Participants were active emergency dispatchers with between one to twenty-six years of work experience. They had to be at least 18 years old, understand written and spoken English, and have a smartphone capable of downloading a mobile application. Participants were excluded if they reported active suicidal ideation (determined by the PHQ-9) or engaged in uncontrolled episodes of alcohol or drug abuse that require treatment (determined by the AUDIT). Participants received $25 compensation at pre-intervention and post-intervention for completion of all six surveys. Sample characteristics are depicted in Table 1.

Table 1: Baseline Characteristic

Characteristics		
	M	*SD*
Age	37.38	8.39
Years as telecommunicator	11.07	6.53
	n	*%*
Gender		
Female	90	76.9
Male	27	23.1
Marital status		
Single	26	22.2
Married	62	53.0
Other	22	24.8
Ethnicity		
Caucasian	91	77.8
African American	7	6.0
Hispanic	12	10.3
American Indian or Alaskan Native	4	3.4
Other	3	2.6
Education		
Less than high school	2	1.7
High school graduate	11	9.4
Some College	49	41.9
Graduate degree	45	38.5
Advanced degree	10	8.5
Type of call exposure from work		
Physical assault	26	22.2
Sexual assault	17	14.5
Serious accident	18	15.4
Life-threatening illness or injury	9	7.7
Disaster exposure	50	42.7
Combat exposure	4	3.4
Other exposures	32	27.4

<u>2.2 Measures</u>

<u>PTSD Checklist</u> (PCL-5; Weathers et al., 2013*)*: The PCL-5 is a reliable and valid self-report

measure of PTSD. Respondents indicated the degree to which they were bothered by each of the

20 PTSD symptoms during the past month on a 5-point Likert scale from 1 (*not at all*) to 5 (*extremely*). The item scores are summed to provide a total symptom severity rating from 20 to 100. A score of 33 or above indicates a probable diagnosis of PTSD (Hoge, Riviere, Wilk, Herrell, & Weathers, 2014).

Patient Health Questionnaire – Depression Subscale (PHQ; Kroenke, Spitzer, & Williams, 2001): The PHQ-depression subscale is a 9-item, a self-report screening tool. The items are based directly on the diagnostic criteria for major depressive disorder in the DSM-IV. This measure provides both the presence of and severity of depressive symptoms. The PHQ-9 has demonstrated good psychometric properties, including test-retest reliability as well as internal consistency (Kroenke. et al., 2001)

Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, Monteiro, & World Health Organization, 2001). The AUDIT is a 10-item self-report measure of problematic alcohol use and associated problems. It is a brief, sum-scored measure that provides information about the quantity and frequency of alcohol use and the potentially harmful consequences. A total score greater than 15 indicates a positive alcohol use disorder.

Generalized Anxiety Disorder Scale 7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) is the 7-item self-report instrument designed to assess anxiety symptoms. Questions are rated using a 4-point Likert scale ranging from 'not at all' to 'nearly everyday' past week. A total score greater than 9 on the GAD-7 indicate moderate to severe anxiety symptoms. Internal consistency ($\alpha = .92$), test-retest reliability ($\alpha = .83$), sensitivity (.89), and specificity (.82) are all good.

Dimensions of Anger Reactions (DAR-5; Forbes et al., 2014); contains five items measuring anger frequency, intensity, duration, interpersonal aggressiveness, and the extent to which anger interferes with interpersonal relationships. Items are measured on a 5-point scale, ranging from 1 (not at all) to 5 (very much). A score of 12 is the cutoff for anger management issues with higher scores indicating greater anger. The DAR-5 has good psychometric properties, including high internal consistency and internal reliability, with Cronbach's a ranging from .86 to .90 (Forbes, Alkemade, Hopcraft, et al., 2014; Forbes, Alkemade, Mitchell, et al., 2014). The DAR-5 demonstrates convergent and concurrent validity with similar well-used measures of anger such as the STAXI-2 (Forbes, Alkemade, Hopcraft et al., 2014).

Inventory of Psychosocial Functioning-brief (IPF; Rodriguez, Holowka, & Marx, 2012). The IPF-brief is a 7-item self-report instrument designed to assess functional impairment across the spectrum of domains: romantic relationships, family relationships, work, friendships and socializing, parenting education, and self-care. Higher scores indicate greater functional impairment. IPF has demonstrated good test-retest reliability and reliability (Bovin et al., 2018).

Life Events Checklist (LEC-5; Weathers et al., 2013). The LEC-5 was utilized to establish baseline exposure to potentially traumatic events. The psychometric properties are not currently available for the LEC-5. In a clinical sample, the original version of LEC was significantly correlated, in the predicted directions, with measures of psychological distress and was strongly associated with PTSD symptoms (Gray, Litz, Hsu, & Lombardo, 2004). Considering the minor modification of the measure, it is expected that there will be very little difference in the psychometric properties of the new version. The LEC was only administered at pre-treatment.

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PTSD Coach Feasibility (Miner et al., 2016) assesses the participant's perception of ease of use for PTSD Coach. A 5-point Likert scale ranging from 1 (*0 times*) to 5 (*10 or more times*) was used for rating items such as "On average, how often each week did you open the app?" Similar questions were used to assess the psychoeducational and self-management sections of the application. The participants also identified barriers to using the application on a 4-point Likert scale: 0 (*not a barrier*) to 3 (*extreme barrier*). The questions included limited time, difficulties using the application, not getting much from the application, and not being able to find what they needed from the application.

PTSD Coach Acceptability (Miner et al., 2016) assesses the perceived helpfulness of PTSD Coach. Participants were asked how helpful they found each section of PTSD Coach (e.g., learn and manage symptoms) on a 5-point Likert scale 0 (*not at all*), 1 (*slightly*), 2 (*moderately*), 3 (*very*), 4 (*extremely*). Additionally, they were asked to rate the helpfulness of the application in developing skills to manage symptoms and decreasing stigma towards PTSD, as well as seeking mental health treatment.

2.3 PTSD Coach Mobile Application

As a standalone psychoeducation and self-management tool, PTSD Coach helps individuals learn new skills to cope with symptoms associated with PTSD (Miner et al., 2016). The application consists of four major sections: Learn, Self-Assessment, Manage Symptoms and Find Support. The Learn section provides psychoeducational information about symptoms, prevalence rates and various treatment options that are available for PTSD. The Self-Assessment

section includes the PCL-5 (Weathers et al., 2013), and interpretive feedback about the severity of reported symptoms. Users can also track symptoms over time by viewing a line graph of past assessments. Manage Symptoms provides coping tools to help address acute PTSD symptoms. The user can rate distress on the Subjective Units of Distress Scale (SUDS) ranging from 0 (*no distress*) to 10 (*extreme distress*) on the following areas; Reminded of Trauma, Avoiding Triggers, Disconnected from People, Disconnected from Reality, Sad/hopeless, Worried/Anxious, Angry, and Unable to Sleep. Contingent on the chosen problem and SUDS rating, the user is presented a CBT-based coping tool such as paced breathing, progressive muscle relaxation, self-coping statements, or pleasant events option. In a situation where the user does not like the recommended tool, he or she can click on the New Tool to receive another suggestion. Lastly, the Find Support section allows users to quickly reach out to others including 911 emergency and crisis support. It also allows users to select individuals from their telephone contact list to include as supports in this section.

2.4 Procedure

This study investigated the acceptability, feasibility and efficacy of PTSD Coach to ameliorate psychological symptoms in emergency dispatchers. Single group pre-post design was used to compare the participant's change in psychological symptoms and to gauge the acceptability of the mobile application among emergency dispatchers. Due to the paucity of studies investigating mobile application intervention among emergency dispatchers, this design was chosen as an initial and logical first step.

After giving informed consent, the dispatchers completed the baseline assessment at the conference booth. All participants completed demographic information (age, gender, marital status, education, number of years employed), and types of calls that they experienced as an emergency dispatcher. They also completed the self-report measures described above. Then participants were provided with a link or a QR code to access the research version of PTSD Coach. A demonstration of how to use the program was provided to all participants to assure that they felt comfortable with the technology.

During the six weeks of the study, the participants used the program whenever they perceived the need to decrease stress. They could select modules such as deep breathing, mindfulness listening, muscle relaxation, and thought stopping. Every three days during this period, participants received a reminder email to utilize the PTSD Coach mobile app. Every seven days after baseline, participants received a survey link to assess psychological symptoms during that week. Assessments included questions regarding types of calls received and the AUDIT, DAR-5, GAD-7, IPF, PHQ-9, PCL-5. These data were collected weekly for 6 weeks (including baseline) to determine changes in emotions and behavior while of using the app. In addition to the weekly measures of symptoms, at the sixth (last) week of the study participants completed questions regarding the application's helpfulness in managing stress symptoms.

The participant flow diagram is presented in Figure 1. One hundred seventeen participants enrolled in the study. The number of participants who completed each weekly assessment varied but averaged around 50 participants at each time point. All participants who completed the post-assessments were considered as study completers ($n = 50$).
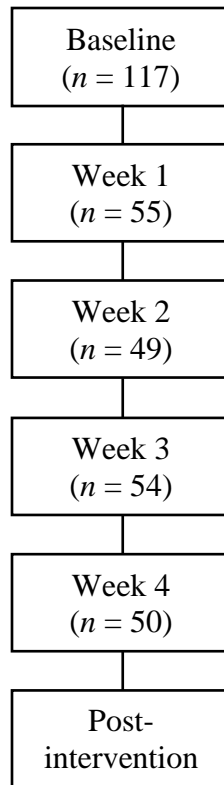
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```
┌─────────────────┐
│    Baseline     │
│   (n = 117)     │
└─────────────────┘
         │
┌─────────────────┐
│     Week 1      │
│   (n = 55)      │
└─────────────────┘
         │
┌─────────────────┐
│     Week 2      │
│   (n = 49)      │
└─────────────────┘
         │
┌─────────────────┐
│     Week 3      │
│   (n = 54)      │
└─────────────────┘
         │
┌─────────────────┐
│     Week 4      │
│   (n = 50)      │
└─────────────────┘
         │
┌─────────────────┐
│      Post-      │
│  intervention   │
└─────────────────┘
```

Figure 1: Participant Flow Diagram

<u>2.5 Power Analysis and Data Analytic Strategy</u>

Due to the dearth of research on the use of mobile application interventions with emergency dispatchers, it is difficult to calculate an exact effect size. One prior study examined the within-group effect for PTSD coach using PCL-5 and reported a medium effect size $t(24) = 2.06$, $p = 0.04$, $d = 0.59$ and saw a significant clinical change (10 point change; Miner et al., 2016). Using that effect size an, A priori power analysis was conducted using GPower 3.1 software (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007).The analysis indicated that 38 participants will be needed to achieve an effect size of 0.6 $\alpha = .05$,

power (1 β) = .95 to detect a 10 point clinically significant change on the PCL-5. Thus, our completer size of 50 participants suggested we had sufficient power.

Descriptive analysis (means, frequencies, standard deviation, and percentages) examined application feasibility, and acceptability of PTSD Coach for emergency dispatchers. For efficacy data, the Kolmogorov-Smirnov test was utilized to determine the normality distributions of the self-report measures which indicated the samples were not normally distributed. Thus, two-tailed Wilcoxon test was used to evaluate the treatment efficacy for the AUDIT, DAR-5, GAD-7, IPF, PHQ-9, and PCL-5 to again account for the non-normality.

CHAPTER 3: RESULTS

Comparison of study completers ($n = 50$) and non-completers ($n = 67$) showed no significant group differences on demographic variables age, gender, marital status and education. Similarly, completers and non-completers showed no significant difference on baseline psychological variables (AUDIT, DAR-5, GAD-7, IPF, PHQ-9, and PCL-5).

3.1 PTSD Coach Acceptability/Helpfulness

Results for PTSD Coach Helpfulness survey are presented in Table 2. Results were broadly positive for the helpfulness ratings. The majority of the participants endorsed the application as providing moderately or greater helpfulness for the various components of the application. Eighty percent also reported overall satisfaction with PTSD Coach.

Table 2: Mean Ratings of Perceived Helpfulness and Satisfaction With PTSD Coach

Items	M (SD) n = 50	Endorsed Moderately to Extremely Helpful
Helping me Learn About Symptoms of PTSD	2.06 (1.00)	74.5%
Helping Me Learn About Treatments for PTSD	2.04 (1.01)	68.6%
Helping Me Find Effective Ways of Managing My Symptoms	2.20 (1.01)	70.6%
Helping Me Feel More Comfortable in Seeking Support	1.80 (1.21)	52.9%
Helping Me Feel There Is Something I Can Do About My PTSD	2.14 (1.05)	70.6%
Helping Me Track My Symptoms	2.08 (1.10)	66.7%
Helping Me Know When I'm Doing Better or When I'm Doing Worse	1.88 (1.15)	58.8%
Increasing My Access to Additional Resources	1.94 (1.10)	60.8%
Providing Practical Solutions to the Problem I Experience	1.96 (.99)	62.7%
Helping me Overcome the Stigma of Seeking Mental Health Services	1.80 (1.28)	52.9%
Helping me Better Understand What I Have Been Experiencing	1.96 (.97)	62.7%
Enhancing my Knowledge of PTSD Symptoms	2.14 (1.05)	72.5%
Helping Clarify Some of the Myths about PTSD	2.16 (1.08)	72.5%
Providing a Way for me to Talk about What I Have Been Experiencing	1.740 (1.29)	54.9%
Overall, How Satisfied Are you with PTSD Coach?	2.46 (1.05)	80.0%

Helpfulness ratings: 0 = not at all, 1 = slightly, 2 = moderately, 3 = very, 4 = extremely.

3.2 PTSD Coach Feasibility

Participants also completed the PTSD Coach Utilization survey to assess the perceived

usefulness of the application. Participants reported a mean of utilizing the homepage of PTSD

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Coach application of 1.38 (SD = 0.70) (scores falling between 1-3 times and 4-6 times) between

baseline and post-intervention. Under the psychoeducation section "Learn about PTSD" page,

participants reported a mean of 1.08 (SD = 0.34). Similarly, the finding resource section "Learn

about Professional Care" page, participants showed comparable levels of use with a mean of 1.06

(SD = 2.42). Lastly, participants reported a mean of 1.26 (SD = 0.52) for the "Self-Assessment"

page where they were able to track and view their PTSD symptoms. Out of the "Manage

Symptoms" categories (Reminded of Trauma, Disconnected from People, Sad/Hopeless, Angry,

Avoiding Triggers, Disconnected from Reality, Worried/anxious, and Unable to Sleep),

participants listed 'Unable to Sleep' (n = 19, 38%) as the most often visited "Manage Symptom"

page and 'Worried/Anxious' (n = 11, 22%) second. Under the wide range of tools offered to

manage stress, relaxation exercise (n = 24, 48%) was reported to be used most often.

Barriers to utilization of the PTSD Coach also were assessed. Overall most participants

did not view these potential barriers as impeding their ability to use the application (see Table 3).

Participants found time as the biggest barrier to using the PTSD coach. Not having enough time

was the most frequently reported barrier with forty-four percent of the sample rating it as

"somewhat of a barrier."

Table 3: Perceived Feasibility of PTSD Coach

Variable	Reported as Most Visited	Percent of Sample Who Visited Page
Manage Symptoms [a]		
Reminded of Trauma	4	8%
Disconnected from People	9	18%
Sad/Hopeless	7	14%
Angry	3	6%
Avoiding Triggers	2	4%
Disconnected from Reality	2	4%
Worried/Anxious	11	22%
Unable to Sleep	19	38%
Barrier to use [b]	*M (SD)*	No Barrier
	n = 50	
I did not have enough time.	2.02 (.87)	30%
I have a lack of family/friend support	1.24 (.56)	82%
It was hard to use the app	1.10 (.36)	92%
I'm not getting much	1.22 (.58)	84%
I couldn't find what I needed	1.14 (.40)	88%

[a] *Responses could be in more than one category.* [b] *0 = not a barrier to 3 = extreme barrier.*

3.3 Efficacy of PTSD Coach

Table 4 present the means and standard deviation for the PTSD symptoms and other measures of psychological distress across each week of the study. For the completers, there was a statistically significant reduction in PTSD symptoms (based on the PCL-5). Wilcoxon Signed-ranks test indicated a significant decrease from baseline (Mdn = 18.00) to post-intervention (Mdn = 5.50) Z = 4.69, p < 0.001. Similarly, there was a significant decrease in the depressive symptoms (based on PHQ-9) for the completers from baseline (Mdn = 6.00) to post-intervention (Mdn = 3.00) Z = 2.30, p = 0.001. Significant decreases were also evident for anxiety symptoms (based on GAD-7) in the completers from baseline (Mdn = 5.00) to post-intervention (Mdn = 3.00) Z = 3.36, p = 0.001. There was a significant decrease in symptoms of anger (based on

DAR-5) between baseline (Mdn = 8.00) to post-intervention (Mdn = 6.00) Z = 3.12, p = 0.002.

Significant decreases in alcohol use (based on the AUDIT) were found between baseline (Mdn =

2.00) to post-intervention (Mdn = 1.00) Z = 2.7, p = 0.007. In contrast, there was no statistically

significant decrease for the level of problematic relationships (based on IPF-B) between baseline

(Mdn = 1.33) and post intervention (Mdn = 1.36, Z = 1.32, p = 0.186) for the completers

Table 4: Psychological Symptom Measures (Completers, _n_ = 50)

Measure	Time					
	Baseline _n_ = 50 _M_ (_SD_)	Week 2 _n_ = 43 _M_ (_SD_)	Week 3 _n_ = 42 _M_ (_SD_)	Week 4 _n_ = 46 _M_ (_SD_)	Week 5 _n_ = 45 M (_SD_)	Post Intervention _n_ = 50 _M_ (_SD_)
PCL-5	19.94 (15.10)	14.28 (12.39)	12.29 (11.60)	11.11 (10.97)	10.49 (11.99)	10.06 (11.61)
PHQ-9	6.67 (4.93)	5.05 (4.23)	4.98 (4.18)	4.70 (4.17)	4.36 (4.27)	4.08 (4.36)
AUDIT	3.28 (3.68)	2.84 (3.51)	2.43 (2.93)	2.85 (3.41)	2.64 (3.04)	2.50 (2.89)
DAR-5	8.76 (3.10)	8.07 (3.10)	7.71 (3.09)	7.98 (3.18)	7.44 (3.32)	7.34 (2.88)
GAD-7	6.10 (5.10)	5.48 (4.21)	5.19 (4.04)	4.65 (3.97)	4.36 (4.68)	3.98 (4.08)
IPF	1.142 (1.12)	1.81 (1.01)	1.63 (1.09)	1.63 (1.32)	1.73 (1.4)	1.66 (1.32)

PCL-5 = PTSD Checklist 5; PHQ-9 = Patient Health Questionnaire- Depression Subscale;
AUDIT = Alcohol Use Disorders Identification Test; DAR-5 = Dimensions of Anger Reactions;
GAD-7 = Generalized Anxiety Disorder Scale; IPF =Inventory of Psychosocial Functioning-
brief.

CHAPTER 4: DISCUSSION

To our knowledge, this is the first study to evaluate the use of a mobile application to alleviate psychological mood symptoms among emergency dispatchers. The psychological symptoms for our population remained between mild and moderate. Although the estimated prevalence for PTSD in emergency personnel ranges from 9 to 30 percent (Clawson & Sinclair, 2001; Dicks, 2014; Lilly & Allen, 2015). Only 13 percent of our participants scored above the cut off score for PTSD which qualifies for probable PTSD. When interpreting our findings, it is important to note that the overall sample's average endorsement of psychological symptoms, one might think of this group as subclinical.

The findings suggest that PTSD Coach is an acceptable, feasible and practical intervention to reduce psychological symptoms among emergency telecommunicators. Regarding acceptability, 80% of the participants endorsed being moderately to extremely satisfied with PTSD Coach. They found that application to be moderately to extremely helpful in learning about PTSD symptoms (75%), learning about PTSD treatments (67%), and finding effective ways to manage symptoms (71%). Findings suggest the participants were able to improve their self-efficacy regarding psychological symptom management (71%), improve insight into their daily symptom severity (60%), as well as feeling more comfortable in seeking treatment (53%) and decreasing stigma toward seeking mental health services (53%).

With respect to usage, dispatchers favored the relaxation exercises to manage problems with sleep, anxiety, and worry. With regard to barriers to using the PTSD Coach, the dispatchers reported that it was not difficult or time consuming to use and got what they expected out the

application. They were able to find what they needed and had no troubles navigating the application. Qualitatively, the dispatchers have reported that they would like to see more brief exercises to be included in the application that they can utilize between emergency calls.

With respect to efficacy, the results support our primary hypothesis. There was a statically significant decrease in psychological symptomatology for PTSD, depression, anxiety, anger, and alcohol use. Results demonstrated a gradual decrease in symptoms across the weekly time points. In contrast, there was no significant effect for interpersonal difficulties. However, participants reported only mild symptoms at baseline which may not have provided any room for change (i.e., a floor effect). This may also be due to the fact that the social resources geared for Veterans within PTSD Coach. While there is a customizable section to include personal phone numbers, the majority of the contact information and service resources are for Veterans. The inclusion of contact information for mental health providers for civilians and emergency dispatchers may help improve this section for this particular population. The application also does not provide tools to improve interpersonal communication or interactions. The includsion of material related to improving communication skills with family members and friends has the potential of improving their interpersonal relationships.

The results of this investigation are consistent with other studies examining PTSD Coach with the Veteran population. Similarities include the acceptability of PTSD Coach where most found the Learn and Manage Symptoms sections to be "moderately helpful" as well as feasibility where most did not find not having enough time, difficulty of use to be a barrier (Miner et al., 2016). However, this study expands the potential use of PTSD Coach. Rather than an adjunctive

aid, this study examined its use as a standalone aid over a brief (one month) period as well as in a subclinical civilian population. At this point we do not know if their scores will decrease or maintain their current symptoms long term.

Our current study has several strengths. On average 40% of the initial participants completed each assessment, a higher percentage than for many online therapies. The study has adequate power to investigate the change in psychological symptoms pre and post-intervention. Although initially developed for Veterans, dispatchers were able to use the application successfully. The participants found selections helpful and reordered lesser emotional distress across study weeks.

While the results are encouraging, the study has some limitations. First, the participants were all attendees of the 2018 NAVIGATOR conference and the psychological symptom severity may not fully reflect the dispatcher population. To more fully assess the feasibility and efficacy of PTSD coach for the dispatcher population, nationwide recruitment is needed. Second, the duration of PTSD Coach use was truncated to five weeks and may not mirror real-world use. A more extended period may have provided more time to use and evaluate all of the features and functionality of the application. Third, the founders of PTSD Coach created the mobile application for the Veteran population. This is the first time the application was used with a civilian population. The data revealed that the application was useful but its utility could be enchanced to address the specific job requirements of this group. Finally, this study did not utilize a control group. However, given the novel use of the PTSD Coach for this investigation, a

pilot study was deemed to be the best use of time and resources. Having now demonstrated

initial success, larger scale investigations with appropriate control groups are warranted.

The data from this investigation contribute to the scant research on the use of technology-

aided interventions for emergency dispatchers. These results have implications for how

psychological symptoms in emergency dispatchers might be addressed on a large scale. Mobile

application such as PTSD Coach offer accessible and often free psychoeducational and self-

management tools to those who may shy away from conventional mental health treatment. The

tools provided in the PTSD Coach allowed the dispatchers to practice and build their self-

efficacy in managing their mood discretely. However, there were only a few modules and

exercises that were not appropriate for the dispatchers. Modules such as the Resources

containing contact information for Veterans and lack of brief one minute relaxation exercises to

use between calls are examples. Therefore, further research of PTSD Coach is needed for the

civilian population, specifically for emergency telecommunicators. Application such as a

modified PTSD Coach is a potential option to not only bring down barriers to care but improve

dissemination of preventative and effective skills for improving mental health care.

APPENDIX A: DEMOGRAPHICS SURVEY

DEMOGRAPHIC DATA

1. How old are you?   Age _____   Gender_____

2. What is your current relationship status? (pick only one)

    1- Single   2- Married   3-Widowed   4-Divorced   5-Living with romantic partner
          6-Separated   7 – other: _____

3. How do you identify ethnically? What is your primary ethnicity?

    1- Native American/Alaskan   2- African American 3--Caucasian   4-Hispanic   5-Asian

    6- Other _____
    Secondary ethnicity _____

4. Who do you live with?   ☐ spouse/partner _____(enter #)   ☐ minor children _____(enter #)
    ☐ adult children _____(enter #)   ☐ grandkids _____(enter #)   ☐ grandparents _____(enter #)
    ☐ other family members _____(enter #)   ☐ roommates _____(enter #)   ☐ renters
    _____(enter #)   ☐Other _____ (description & #)

EDUCATION AND WORK HISTORY

5. How far did you get in school?

        1- Did not complete High School

                                    2- High School/GED   3- Some College

            4- College Graduate   5- Advanced/Professional Degree

6. Are you currently a student (actively taking classes towards GED or college degree)?

        1- Yes   0- No

7. Employment status

        1- Full time   2 – Part time

8. How many years have you worked as an emergency dispatcher? _____ years (total)

CURRENT SOCIAL FUNCTIONING

9. Have you been experiencing any unusual stressors lately? (e.g. death of a loved one, divorce)

□ none   □ bereavement   □ divorce/intimate partner discord
□legal   □ family issues   □ financial   □ physical health   □ other
Briefly describe:
_____

OVERVIEW OF PHYSICAL AND MENTAL HEALTH HISORY
1. How is your physical health?

1- Excellent   2- Very Good   3- Good   4- Fair   5- Poor
Have you had any recent medical problems?   1- Yes 0- No
If YES, what medical condition(s)

_____

_____

2. You will be using a mobile application for the study.

Do you have any problems completing tasks that require using your hands, such as writing, typing, or following an object with your finger?

If yes, briefly describe: _____
1- Yes   0- No
3. Are you currently receiving any psychological treatment?

1- Yes   0- No

If YES, what psychological treatment(s)
_____

_____

4. Have you received any psychological treatment in the past?

1- Yes   0- No

If YES, what psychological treatment(s)
_____

APPENDIX B: MEASURES

Alcohol Use Disorders Identification Test (AUDIT)

Because alcohol use can affect your health and can interfere with certain treatments, it is important that we ask some questions about your use of alcohol. Your answers will remain confidential so please be honest. Circle the answer that best describes your response to each question.

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

Dimensions of Anger Reactions (DAR-5)

Please tick the box that best describes how you feel. There are no right or wrong answers.

1. I often find myself getting angry at people or situations

□ Not at all   □ A little   □ Moderately   □ A lot   □ Very much

2. When I get angry, I get really mad

□ Not at all   □ A little   □ Moderately   □ A lot   □ Very much

3. When I get angry, I stay angry

□ Not at all   □ A little   □ Moderately   □ A lot   □ Very much

4. When I get angry at someone, I want to hit or clobber the person

□ Not at all   □ A little   □ Moderately   □ A lot   □ Very much

5. My anger prevents me from getting along with people as well as I'd like to

□ Not at all   □ A little   □ Moderately   □ A lot   □ Very much

Generalized Anxiety Disorder Scale (GAD-7)

Over the last 2 weeks, how often have you been bothered by the following problems? *(Use "✔" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

*(**For office coding: Total Score T____ = ____ + ____ + ____**)*

Inventory of Psychosocial Functioning (Brief)

Overall, in the past 30 days:	Not at All		Somewhat			Very Much		Not applicable
1. I had trouble in my romantic relationship with my spouse or partner.	0	1	2	3	4	5	6	7
2. I had trouble in my relationship with my children.	0	1	2	3	4	5	6	7
3. I had trouble with my family relationships.	0	1	2	3	4	5	6	7
4. I had trouble with my friendships and socializing.	0	1	2	3	4	5	6	7
5. I had trouble at work.	0	1	2	3	4	5	6	7
6. I had trouble with my training and education.	0	1	2	3	4	5	6	7
7. I had trouble with day to day activities, such as doing household chores, running errands and managing my medical care.	0	1	2	3	4	5	6	7

Life Events Checklist 5 (LEC-5)

Instructions: Listed below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you're not sure if it fits; or (f) it doesn't apply to you.

Be sure to consider your *entire life* (growing up as well as adulthood) as you go through the list of events.

Event	Happened to me	Witnessed it	Learned about it	Part of my job	Not sure	Doesn't apply
1. Natural disaster (for example, flood, hurricane, tornado, earthquake)						
2. Fire or explosion						
3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)						
4. Serious accident at work, home, or during recreational activity						
5. Exposure to toxic substance (for example, dangerous chemicals, radiation)						
6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)						
7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)						
8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)						
9. Other unwanted or uncomfortable sexual experience						
10. Combat or exposure to a war-zone (in the military or as a civilian)						
11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)						
12. Life-threatening illness or injury						
13. Severe human suffering						
14. Sudden violent death (for example, homicide, suicide)						
15. Sudden accidental death						
16. Serious injury, harm, or death you caused to someone else						
17. Any other very stressful event or experience						

PTSD Checklist 5 Checklist (PCL-5)

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem <u>in the past month</u>.

In the past month, how much were you bothered by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0	1	2	3	4
4. Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	0	1	2	3	4
10. Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from other people?	0	1	2	3	4
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15. Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being "superalert" or watchful or on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having difficulty concentrating?	0	1	2	3	4
20. Trouble falling or staying asleep?	0	1	2	3	4

APPENDIX C: PTSD COACH SURVEY

USE OF THE PTSD COACH APP

The following questions ask about your use of the PTSD Coach App.
Mark the appropriate box.

	1-3 times	4-6 times	7-9 times	>10 times
1. How often did you go to the homepage of the PTSD Coach app?	☐	☐	☐	☐

	1-3 times	4-6 times	7-9 times	>10 times
2. How often did you go to the "Learn About PTSD" page of the app?	☐	☐	☐	☐

	1-3 times	4-6 times	7-9 times	>10 times
2a. How often did review the content in the "Learn About PTSD" page of the app?	☐	☐	☐	☐

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
	0	1	2	3	4
2b. How **helpful** was the information in the "Learn About PTSD" page?	☐	☐	☐	☐	☐

	1-3 times	4-6 times	7-9 times	>10 times
3. How often did you go to the "Learn About Professional Care" page of the app?	☐	☐	☐	☐

	1-3 times	4-6 times	7-9 times	>10 times
3a. How often did you review the content in the "Learn About Professional Care" page?	☐	☐	☐	☐

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
3b. How **helpful** was the information in the "Learn About Professional Care" page?	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐

		1-3 times	4-6 times	7-9 times	>10 times
4. How often did you go to the "Self Assessment" page?		☐	☐	☐	☐

4a. Did you take an assessment over the weekend?	☐ Yes	☐ No

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
4b. How **helpful** was "taking an assessment"?	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐
4c. Did you set a schedule to regularly take the assessment?	☐ Yes	☐ No			

		1-3 times	4-6 times	7-9 times	>10 times
5. How often did you go to the "Manage" page of the app?		☐	☐	☐	☐

5a. The following symptoms are listed on the "Manage Symptoms" page. Which one did you go to **most often?**

☐ Reminded of the Trauma	☐ Avoiding Triggers
☐ Disconnected from People	☐ Disconnected from Reality
☐ Sad/Hopeless	☐ Worried/Anxious
☐ Angry	☐ Unable to Sleep

5b. The following symptoms are listed on the "Manage Symptoms" page. Which one did you go to **least often**?

☐ Reminded of the Trauma	☐ Avoiding Triggers
☐ Disconnected from People	☐ Disconnected from Reality
☐ Sad/Hopeless	☐ Worried/Anxious
☐ Angry	☐ Unable to Sleep

5c. A wide range of tools were offered to help manage your stress, which one did you use **most often**?

☐ Relaxation Exercise	☐ Sleep Hygiene Tips
☐ RID	☐ Schedule Pleasant Events
☐ Change your perspective	☐ Seek Support
☐ Grounding	☐ Distract from Intense Emotions
☐ Make a Plan to Reduce Isolation	☐ Soothe Yourself
☐ Take a Time Out	☐ Inspiring Quotes

5d. A wide range of tools were offered to help manage your stress, which one did you use **least often**?

☐ Relaxation Exercise	☐ Sleep Hygiene Tips
☐ RID	☐ Schedule Pleasant Events
☐ Change your perspective	☐ Seek Support
☐ Grounding	☐ Distract from Intense Emotions
☐ Make a Plan to Reduce Isolation	☐ Soothe Yourself
☐ Take a Time Out	☐ Inspiring Quotes

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
6. How **helpful** were the tools offered to manage your symptoms?	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐

7. Did you select any favorites?	☐ Yes	☐ No

7a. If so, which ones were your favorites? _____

8. How often did you use the "Find Support" page?	1-3 times ☐	4-6 times ☐	7-9 times ☐	>10 times ☐

8a. How often did you use the "Get Support Right Now" page?	1-3 times ☐	4-6 times ☐	7-9 times ☐	>10 times ☐

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
8b. How **helpful** was the information from the "Get Support Right Now" page?	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐

8c. Did you set up a support network?	☐ Yes	☐ No

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
8d. How **helpful** was the setup a support network option?	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐

	1-3 times	4-6 times	7-9 times	>10 times
9. How often did you use the "Find Professional Care" page?	☐	☐	☐	☐

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
9a. How **helpful** were was the information in the "Find Professional Care" page?	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐

	1-3 times	4-6 times	7-9 times	>10 times
10. How often did you go to the "Setup" page of the app?	☐	☐	☐	☐

10a. Did you add an image(s)?	☐ Yes ☐ No

10b. Did you add songs or other audio files?	☐ Yes ☐ No

10c. Did you add support contact(s)?	☐ Yes ☐ No

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
10d. How **helpful** was it to add personal images, songs/audio files, and/or con	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐

BARRIERS TO USE OF THE PTSD Coach App

There are different reasons why people might not use the PTSD Coach App, or might use it infrequently. Please indicate to what extent each of the following factors **limit your use of the PTSD Coach App**…

	Not a barrier	Somewhat of a barrier	Moderate barrier	Extreme barrier
11. I did not have enough time.	1	2	3	4
12. I have a lack of family/friend support.	1	2	3	4
13. It was hard to use the app.	1	2	3	4
14. I'm not getting much out of it.	1	2	3	4
15. I couldn't find what I needed.	1	2	3	4

PERCEIVED HELPFULNESS OF THE PTSD Coach App

Please indicate the extent to which the PTSD Coach has (or has not) been helpful in working towards of the following goals:

	Not at all Helpful	Slightly Helpful	Moderately Helpful	Very Helpful	Extremely Helpful
16. Helping me learn about symptoms of PTSD	0	1	2	3	4
17. Helping me learn about treatments for PTSD	0	1	2	3	4
18. Helping me find effective ways of managing my symptoms	0	1	2	3	4
19. Helping me feel more comfortable in seeking support	0	1	2	3	4
20. Helping me feel that there's something I can do about my PTSD	0	1	2	3	4
21. Helping me track my symptoms	0	1	2	3	4
22. Helping me know when I'm doing better or when I'm doing worst	0	1	2	3	4
23. Increasing my access to additional resources	0	1	2	3	4
24. Providing practical solutions to the problems I experience	0	1	2	3	4
25. Helping me overcome the stigma of seeking Mental health services	0	1	2	3	4
26. Helping me better understand what I have been experiencing	0	1	2	3	4
27. Enhancing my knowledge of PTSD	0	1	2	3	4
28. Helping clarify some of the myths about PTSD	0	1	2	3	4
29. Providing a way for me to talk about what I have been experiencing	0	1	2	3	4

	Not at all Satisfied	Slightly Satisfied	Moderately Satisfied	Very Satisfied	Extremely Satisfied
30. Overall, how satisfied are you with the PTSD Coach App?	0 ☐	1 ☐	2 ☐	3 ☐	4 ☐

APPENDIX D: INSITUTIONAL REVIEW BOARD APPROVAL LETTER

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
          FWA00000351, IRB00001138

To: **Emy A Willis, Clint A Bowers, Deborah Casamassa Beidel, Sandra M Neer**

Date: **March 29, 2018**

Dear Researcher:

On 03/29/2018 the IRB approved the following modifications / human participant research until 03/28/2019 inclusive:

Type of Review:	UCF Initial Review Submission Form
	Expedited Review Categories # 6 and 7
	Adult Participants; n=120
	This approval includes a Waiver of Written Documentation of Consent allowing online consent
Project Title:	The Examination of Mobile Application for the Reduction of Stress-Related Symptoms in 9 -1-1 Emergency Telecommunication Dispatchers
Investigator:	Emy A Willis
IRB Number:	SBE-18-13882
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

If continuing review approval is not granted before the expiration date of 03/28/2019, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved consent language is required for online consent. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation.

Participants or their representatives must receive a copy of the consent form.

Page 1 of 2

Use of the approved and stamped flyer is required. Please download the stamped version from iRIS.

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

This letter is signed by:

Signature applied by Jennifer Neal-Jimenez on 03/29/2018 09:47:12 AM EDT

Designated Reviewer

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