

**Mindfulness is Associated with Less Severe Symptoms of PTSD and Depression in Combat  
Deployed Post-9/11 Military Veterans**

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**Abstract**

**Objectives:** Combat experiences predict PTSD and depression in U.S. military veterans. However, few studies have investigated associations between mindfulness and these constructs. We address this gap by (1) comparing main, direct and indirect effects for mindfulness and combat experiences on veterans' symptoms of PTSD and depression and (2) by investigating the explanatory value of mindfulness on outcome variance in these models.

**Methods:** 577 post-9/11 era military veterans residing in four major U.S. cities completed online surveys asking about their combat experiences, mindfulness, and mental health. Two multivariable OLS regression models investigated main effects of mindfulness and combat experiences on veterans' mental health symptoms. Path models examined direct and indirect effects of combat experience and mindfulness on mental health outcomes.

**Results:** There were main effects for mindfulness ( $\beta=-0.67$ ,  $p<0.001$ ), ( $\beta=-0.69$ ,  $p<0.001$ ) and combat experiences ( $\beta=0.18$ ,  $p<0.001$ ), ( $\beta=0.10$ ,  $p<0.001$ ) on PTSD and depression respectively. In both models, mindfulness significantly increased model  $R^2$ . There were significant direct effects for mindfulness and combat experiences and indirect effects for combat experiences on outcomes through the mindfulness pathway.

**Conclusions:** This study contributes to research investigating the effects of combat experiences and mindfulness on military veterans' symptoms of PTSD and depression. Main effects for mindfulness on outcomes were greater in magnitude than effects for combat

experiences, and mindfulness explained a large and significant proportion of the variance in outcomes. Results suggest that mindfulness may be an underexplored variable in PTSD and depressive symptoms for combat-deployed veterans.

## **Introduction**

Nearly 2,000,000 veterans of the Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) military conflicts are eligible to receive Veterans Health Administration (VHA) services (VHA, 2016). While evidence indicates that many OEF/OIF veterans cope well with their military experiences (Kang et al., 2015; Kang & Bullman, 2009), they are at risk for mental health disorders including PTSD and depression (Bruce, 2010; Kang et al., 2015; Seal et al., 2009). Prevalence estimates in this cohort are 23% for PTSD and 11% to 16% for depression (Holderman, 2009; Kilgore, Melba, Castro & Hoge, 2006), though some recent studies show depression rates as high as 21% (Vaughn et al., 2014). PTSD and depression are among the most salient predictors of poor psychosocial outcomes in veterans, including social and economic dysfunction, risky behavior, and suicide (Barr et al., 2016; McFall & Cook, 2006; Ramchand et al., 2015). Combat experiences are particularly salient predictors of PTSD and depression in OEF/OIF veterans; this risk increases with the amount and intensity of combat experience (Castro & McGurk, 2007; LeardMann et al., 2013). Combat experiences like exposure to killing, wounding of service members by friendly fire, witnessing a friend being wounded or killed, exposure to dead or dying people, and being fired upon are most closely associated with PTSD (Guyker et al., 2013; Hoge et al., 2004; Killgore et al., 2006; 2008; Stretch et al., 1996). Theoretical accounts of PTSD etiology posit that following exposure to adverse events like combat experiences, disturbances in consciousness, perception, and memory, as well as efforts to avoid event-related thoughts, emotions, and memories, are instrumental in the development and maintenance of trauma symptoms (APA, 2000; Batten, Orsillo & Walser, 2005; Foa, Steketee & Rothbaum, 1989; Follette et al., 2006; Walser & Hayes, 2006). Empirical studies support this view and demonstrate that experiential avoidance, avoidant coping, thought suppression, and dissociation are associated with increased PTSD and depressive symptoms following traumatic experiences (Gil, 2005; McCaslin et al., 2008; Briere, Scott & Weathers, 2005; Morina et al., 2008; Silver et al., 2002; Tull et al., 2004).

As efforts to prevent and treat PTSD and depressive symptoms in military service members and veterans have continued, an emerging theoretical and empirical literature has begun to investigate mindfulness as a protective factor (Johnson et al., 2014; Smith et al., 2011; Thompson, Arnkoff & Glass, 2011; Vujanovic et al., 2013). Mindfulness is conceptualized as a special way of paying attention to internal experience. For example, Linehan's (1993) definition specifies observing, describing and participating in cognitive and emotional experience without judgment. Others have defined mindfulness as "bringing one's complete attention to the present experience on a moment-to-moment basis" (Marlatt & Kristeller, 1999, p. 68) and as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p. 4). These definitions include three core components: a focus on present moment experience, attention control, and a nonjudgmental attitude. The theoretical literature suggests that mindfulness may protect against PTSD and depressive symptoms in several ways, including creating present-centered awareness and nonjudgmental acceptance of aversive mental states, which may in turn decrease guilt, shame, and avoidance associated with PTSD symptoms (Henning & Frueh, 1997; Walser and Westrup, 2007). In addition, mindfulness is associated with psychological flexibility, which may facilitate interruption of avoidant, ruminative, or other maladaptive cognitive patterns associated with the PTSD and depressive symptoms (Jha, Krompfitner, & Baime, 2007). Finally, studies have shown that mindfulness practice can produce brain changes in limbic and cortical regions associated with reduced reactivity to aversive stimuli and improved emotion regulation (Tang, Holzel & Posner, 2015). In this way, theories of mindfulness predict that more mindful individuals may be better equipped to apply cognitive control and regulation strategies to aversive mental states associated with PTSD and depressive symptoms.

These theoretical accounts are supported by the empirical mindfulness literature. For example, mindfulness has been shown to be a significant predeployment predictor of postdeployment distress, anxiety, and arousal in National Guard soldiers (Call, Pitcock, & Pyne, 2015). In another study conducted with Marine infantry platoons investigating the effects of Mindfulness-based Mind Fitness Training (Stanley, 2014), a mindful attention training intervention designed for high-stress cohorts, results showed improved mindfulness and enhanced heart and breathing rate recovery for the intervention condition after military training exercises designed to induce stress. Further, neuroimaging showed changes in brain regions linked to information processing about the body's internal physiological state and response to stress (Johnson et al., 2014). Several studies have also shown that mindfulness-based interventions including Mindfulness-Based Cognitive Therapy (Segal, Williams, & Teasdale, 2012) and

Mindfulness-Based Stress Reduction (Kabat-Zinn, 1990) are linked to reductions in self-reported PTSD and depressive symptoms in combat-exposed veterans (Bhatnagar et al., 2013; Kearney, McDermott, Malte, Martinez, & Simpson, 2012; A. P. King et al., 2013). Taken together, these findings suggest that mindfulness is associated with better physiological and psychological functioning following exposure to military-related stressors, and that enhancing mindfulness may protect against or reduce PTSD and depressive symptoms following adverse experiences, including combat.

Despite the theoretical and empirical evidence in support of mindfulness as a protective factor for military-related PTSD and depressive symptoms, the main, additive, direct, and indirect effects of combat experiences and mindfulness on PTSD and depressive symptoms in OEF/OIF era military veterans are not well understood. Within the broader goal of improving understanding of associations among these constructs, the first aim of this study was to examine the main effects of combat experiences and mindfulness on PTSD and depressive symptoms as well as the additive explanatory potential of mindfulness in main effects models. The second aim was to examine and compare direct and indirect effects among combat experiences, mindfulness, and PTSD and depressive symptoms. To address our first aim, we hypothesized that (1) combat experiences would demonstrate positive main effects for the outcomes PTSD and depression, while (2) mindfulness would demonstrate negative main effects for these outcomes. We also hypothesized that (3) mindfulness would significantly increase the variance explained by main effects models examining associations between combat experiences, covariates, and PTSD and depressive symptoms. To address our second aim, we hypothesized that (4) combat experiences would demonstrate a negative direct effect on mindfulness and positive indirect effects on PTSD and depressive symptoms through the mindfulness pathway, while mindfulness would demonstrate a negative direct effect on PTSD and depressive symptoms.

Due to the cross-sectional design of this study, we were not able to examine the role of mindfulness in the longitudinal development or maintenance of PTSD or depression. Consistent with common practice in the military behavioral health literature, the covariates age, gender, race/ethnicity, marital status and education were included in statistical models (Dedert et al., 2009; Vasterling et al., 2010; Vujanovic et al., 2013). A recent meta-analysis of risk factors for military related PTSD showed that younger age, female gender, and minority race/ethnicity are associated with increased risk for PTSD and depression, whereas higher educational achievement and being married were associated with reduced risk (Xue et al., 2015).

## Method

### Participants

Study participants were recruited from a sampling frame comprising veterans who participated in the Los Angeles/Orange County, Chicago, and Bay Area Veterans' Surveys conducted by [blinded for review] (blinded for review). All those who agreed to be contacted for future research were invited to take part in the study. Inclusion criteria were veteran status (not currently serving in the military) and separation from the military after September 11, 2001; respondents who did not endorse these two categories in the survey were automatically blocked from proceeding. There were no additional exclusion criteria. Upon completing the survey, participants received a \$15 Amazon gift card. Sample descriptive statistics are presented in table 1.

### Procedure

The investigators built the survey instrument in Qualtrics and created a MailChimp account to distribute the survey. Twice per month, the investigators sent the survey to participants who had agreed to be contacted after first removing email addresses of those who had already completed the survey as well as those who requested to be removed from the mailing list and those who endorsed either of the two exclusion criteria. Following survey distribution, investigators verified that raw surveys had been completed by valid participants by confirming that email addresses associated with completed surveys were also associated with individuals included in the initial sampling frame. Gift cards were then provided electronically to valid participants. Data collection was conducted from July, 2016, to February, 2017, until the target of 1,000 completed surveys was reached. A flowchart detailing sample composition is presented in figure 1. All procedures were approved by the institutional review board at [blinded for review].

### Measures

**Demographic covariates.** Demographic covariates included age; gender categories male, female, or transgender; race categories White, Black, Latino, or other; marital status categories single, married or living with a partner, and divorced or separated; and level of education categories no college degree, AA or BA degree, or graduate degree. All demographic variables were assessed with dichotomous items (0="no" and 1="yes").

**Combat experiences.** Combat experiences were measured using the 13-item short version of the Combat Experiences Scale (CES), available on request from the Deployment Risk and Resilience Inventory (King et al., 2006; from: [http://www.ncptsd.va.gov/ncmain/assessment/assessmt\\_request\\_form.html](http://www.ncptsd.va.gov/ncmain/assessment/assessmt_request_form.html)). Scale items are

dichotomous (0="no" and 1="yes") and capture common impactful deployment-related experiences. Items begin with the question stem "While deployed, did you experience any of the following events" and include experiences such as "seeing dead bodies or human remains" and "being attacked or ambushed". Chronbach's alpha for the CES in this sample was 0.88, with  $M=6.47$ ,  $SD=4.02$ . Scores ranged from 0 to 13. Self-report of combat experiences, though dependent on personal memory, can be used to assess combat history (Adler, Vaitkus & Martin, 1996; Schlenger et al., 1992).

**Mindfulness.** Mindfulness was measured using the Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003), a 15-item measure on a 6-point Likert type scale. Response options range from 1 *almost always* to 6 *almost never*. Sample items include "I find it difficult to stay focused on what's happening in the present" and "I find myself doing things without paying attention". To facilitate interpretation of results, MAAS scores were recoded so that higher scores indicate more mindful attention. Chronbach's alpha for the MAAS was 0.93 in these data, with  $M= 3.33$ ,  $SD=0.99$ . MAAS mean scores ranged from 1 to 6.

**Posttraumatic Stress Disorder.** PTSD was measured using the 20-item PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013). Participants responded to each item on a 5-point Likert-type scale with options ranging from 0 *Not at all* to 4 *Extremely*, with higher scores indicating more PTSD symptoms. Sample items begin with the question stem "In the past month, how much were you been bothered by" and include "repeated, disturbing, and unwanted memories of the stressful experience" and "Having strong negative feelings such as fear, horror, anger, guilt, or shame". Chronbach's alpha for The PCL-5 in these data was 0.96, with  $M= 38.16$ ,  $SD=20.27$ . PCL-5 scores ranged from 0–80.

**Depression.** Depression was measured using the Patient Health Questionnaire 9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), a 9-item measure on a 4-point Likert type scale ranging from 0 *Not at all* to 3 *Nearly every day*, with higher scores indicating more severe depressive symptoms. Items begin with the question stem "Over the last two weeks, how often have you been bothered by the following problems" and include "feeling down, depressed or hopeless" and "trouble concentrating on things, such as reading the paper or watching television." Chronbach's alpha for the PHQ-9 in these data was 0.89, with  $M= 11.52$ ,  $SD=6.75$ . PHQ-9 scores ranged from 0 to 27.

### Data Analyses

Zero-order correlations for all study variables were computed and are presented in table 2. Two multivariable ordinary least squares (OLS) regression models were estimated to test study hypotheses (1) and (2) by

examining main effects of mindfulness and combat experiences on veterans' symptoms of PTSD and depression. Continuous variables were examined for skewness and homoscedasticity of residuals. Regression model one examined main effects of mindfulness, combat experiences, and covariates including age, race, marital status and education on PTSD symptoms. Regression model two examined main effects of these predictors and covariates on symptoms of depression. To facilitate interpretation of effects, mindfulness and deployment experience variables were centered on the mean and no linear transformations were performed. After examining results of regression analyses, two path models were specified to test hypothesis (3) by estimating direct effects of combat experiences on mindfulness, PTSD, and depression and direct effects of mindfulness on PTSD and depression, as well as indirect effects of combat experiences on PTSD and depression through the mindfulness pathway. The estimator was maximum likelihood with missing values. Hypothesis (4) was tested by examining the  $F$  statistic to determine whether adding the mindfulness variable to regression models one and two significantly increased model  $R^2$ .

Covariates were entered into models as binary variables. Modelled race categories included Black, Latino, and a combined all other race category with contrast category White race. Male gender was modeled with contrast category female. Marital status categories were modeled as single or divorced/separated from a partner with contrast category married or cohabitating with a partner. Education categories were modeled as no degree and advanced (Master's or Doctoral) degree with contrast category BA or Associate's Degree. All analyses were performed in Stata version 14.1 (StataCorp, 2015).

## Results

The great majority of study participants reported at least one deployment (87.57%) and at least one combat experience (84.06%). Regression diagnostics showed that mindfulness and combat experiences variables were skewed slightly to the right, though examination of residual plots and the Breusch-Pagan test (Zeileis & Hothorn, 2002) for homoscedasticity of residuals ( $X^2(1) = 0.02$ ,  $\text{prob} > X^2 = 0.88$ ) supported OLS regression assumptions regarding homoscedasticity. Regression model one demonstrated a negative main effect for mindfulness ( $\beta = -0.67$ ,  $p < 0.001$ ) and a positive main effect for combat experiences ( $\beta = 0.18$ ,  $p < 0.001$ ) on PTSD symptoms. Comparison of standardized coefficients indicated that the magnitude of effect for mindfulness was approximately 3.5 times the effect for combat experiences. In addition, Latino ethnicity ( $\beta = 0.09$ ,  $p < 0.01$ ), age ( $\beta = 0.11$ ,  $p < 0.001$ ), and having no college degree ( $\beta = 0.07$ ,  $p < 0.05$ ) were significantly and positively associated with PTSD symptoms. Model one explained 60% of the variance in PTSD symptoms in these data. The addition of mindfulness to a model examining

the effects of combat experiences and covariates on PTSD symptoms yielded a significant increase in the model  $R^2$ , from 0.24 to 0.60 ( $F(1, 506) = 469.07, p < .001$ ).

Parameter estimates for regression model two showed a significant negative main effect for mindfulness ( $\beta = -0.69, p < 0.001$ ) and a positive main effect for combat experiences ( $\beta = 0.10, p < 0.001$ ) on symptoms of depression. As with PTSD symptoms, mindfulness was a stronger predictor of symptoms, with higher mindfulness scores linked to lower PHQ-9 scores. Among model two covariates, only divorce / separation from a cohabitating partner was significantly associated with depressive symptoms ( $\beta = 0.09, p < 0.01$ ). Model two explained 57% of the variance in depressive symptoms in these data. As in model one, adding mindfulness to a model examining effects of combat experiences and covariates on depressive symptoms yielded a significant increase in the model  $R^2$ , from 0.18 to 0.57 ( $F(1, 510) = 455.56, p < .001$ ). All standardized and unstandardized coefficients, standard errors, and 95% confidence intervals for parameter estimates are presented in Table 3.

In path model one, mindfulness demonstrated a direct effect on PTSD symptoms ( $\beta = -0.67, p < 0.001$ ). In addition, results showed direct effects for combat experiences on mindfulness ( $\beta = -0.37, p < 0.001$ ) and PTSD symptoms ( $\beta = 0.19, p < 0.001$ ) as well as an indirect effect on PTSD symptoms through the mindfulness pathway ( $\beta = 0.25, p < 0.001$ ). This is interpreted to mean that for a unit increase in combat experiences, we can expect to see a quarter of a standard deviation increase in PTSD symptoms via lower mindfulness. The total effect for combat experiences on PTSD symptoms was ( $\beta = 0.44, p < 0.001$ ). Path model one with standardized parameter estimates is shown in figure 2. In path model 2, mindfulness demonstrated a direct effect on depressive symptoms ( $\beta = -0.69, p < 0.001$ ). In addition, results showed significant direct effects for combat experiences on mindfulness ( $\beta = -0.37, p < 0.001$ ) and depressive symptoms ( $\beta = 0.11, p < 0.001$ ) as well as an indirect effect on depressive symptoms through the mindfulness pathway ( $\beta = 0.26, p < 0.001$ ). As with path model one, this can be interpreted to mean that for a unit increase in combat experiences, we can expect to see about a quarter of a standard deviation increase in depressive symptoms via lower mindfulness. The total effect for combat experiences on depression was ( $\beta = 0.37, p < 0.001$ ). Path model 2 with standardized parameter estimates is shown in figure 3.

## Discussion

This study compared main, direct, and indirect effects of combat experiences and mindfulness on symptoms of PTSD and depression, two of the two most common mental health disorders associated with OEF/OIF military service. While high rates of deployment, combat experiences, and PTSD and depressive symptoms in the



current sample may limit this study's generalizability to the larger veteran population, study results contribute to improved understanding of the subset of combat-deployed veterans who suffer from PTSD and depressive symptoms. Study hypothesis (1) was supported. Consistent with previous research, combat experiences demonstrated positive main effects for both PTSD and depression. While military personnel undergo substantial training to prepare for combat experiences which may include killing and witnessing the death of comrades, enemy combatants, and civilians, the research literature nevertheless shows these experiences to have a linear and cumulative effect on PTSD and depressive symptoms such that more combat experiences, both in terms of frequency and intensity, predict more symptoms (Guyker et al., 2013; Mayeux et al., 2008; Hoge et al., 2004). Hypothesis (2) was also supported. Mindfulness demonstrated negative main effects for both PTSD and depression several times greater in magnitude than the main effects for combat experiences. This difference in magnitude is noteworthy because combat experiences are a robust predictor of PTSD and depressive symptoms well-documented in the veteran mental health literature, and researchers have called for additional investigation to explore modifiable protective factors, like mindfulness, with comparable effect sizes (Vogt, Pless, King & King, 2005; Xue et al., 2015). Regression results also supported hypothesis (3). Accounting for the additive effect of mindfulness in OLS models resulted in an increase of over 30% in the variance explained by each model. This indicates that difficulties with attention control and awareness represent important dimensions of combat-related PTSD and depression and suggests that modifying attentional processes might impact risk for these disorders.

One interpretation for this constellation of findings is that individuals with higher levels of trait mindfulness may be more resilient to psychological stresses associated with combat exposure. This interpretation is consistent with the previous research showing that mindfulness-based interventions can improve neurological and physiological mechanisms of stress recovery (Johnson et al., 2014). However, study results can also be interpreted to suggest that exposure to combat experiences, as well as PTSD and depressive symptoms, may degrade trait mindfulness. It may be that pathways of influence among mindfulness, PTSD symptoms, and depression, are multidirectional; higher levels of trait mindfulness may support resilience to combat stresses, but mindfulness may be degraded when coping thresholds are exceeded in the context combat experiences and persistent PTSD and depressive symptoms.

Results of path analysis supported hypothesis (4) and provided additional insight into the pattern of associations among combat experiences, mindfulness, and PTSD and depressive symptoms. Significant direct

effects were observed for combat experiences and mindfulness on symptoms of both PTSD and depression, and combat experiences demonstrated a positive indirect effect on both outcomes through the mindfulness pathway. For both PTSD and depressive symptoms, the indirect effects for combat experiences were larger than the direct effects. That is, the largest proportion of the total effect for combat experiences on PTSD and depressive symptoms in these data resulted from the product of the negative direct effect of combat experiences on mindfulness and the negative direct effect of mindfulness on PTSD and depressive symptoms. Combat experiences thus exerted the greatest effect on PTSD and depressive symptoms by reducing the protective effect of mindfulness on these outcomes. This pattern of associations supports the view that mindfulness may be an underexplored variable in the well-documented pathway linking combat experiences and with PTSD and depression. While additional research is required in order to clarify causal pathways among these constructs, both logical analysis and the empirical literature provides support for the view that combat experiences influence mindfulness, PTSD, and depressive symptoms rather than the reverse. The relation between mindfulness and PTSD and depressive symptoms, however, may be more nuanced. The strong negative effect of mindfulness on symptoms of PTSD and depression in both full regression and path models, in conjunction with previous literature showing that improving mindfulness can enhance attention control, cognitive flexibility, and emotion regulation, supports the view that these mechanisms may in turn protect against the development and maintenance of PTSD and depressive symptoms in military populations (Johnson et al., 2014; Tang, Hölse & Posner, 2015). At the same time, it may be that PTSD and depressive symptoms inhibit mindful attention and awareness. Particularly if mindfulness skills are not well developed, emotional and cognitive dysregulation associated with PTSD and depressive symptoms may disrupt present-centered, nonjudgmental attention and awareness of thoughts, feelings and urges. More longitudinal studies are required to improve understanding of the pathways of influence that characterize relations among combat experiences, mindfulness, and PTSD and depressive symptoms in veterans.

Improving understanding of modifiable protective factors, including mindfulness, that buffer against the development of PTSD and depressive symptoms in combat exposed veterans is important for a several reasons. Both PTSD and depression are socially and economically costly disorders, and much of the previous veteran mental health research literature has often focused on risk factors that are inseparable from the military's core mission, like combat, and hypothesized protective factors, like grit, for which efficacious interventions have not been developed (Crede, Tynan & Harms, 2017; Ramchand et al., 2015; Schultz, Glickman & Eisen, 2014). Many previously

examined risk factors, like combat experiences, pre-existing mental health conditions, or adverse experiences prior to military service, are difficult to modify. For example, it is unlikely that service members deployed to combat zones or unpredictable operating theatres will be able to effectively limit their exposure to adverse experiences directly related to their military role. Mindfulness, however, is a highly modifiable characteristic (Chiesa & Serretti, 2010; Keng, Smoski & Robins, 2011) targeted by existing evidence-based interventions with robust empirical support (Hayes & Feldman, 2004; Hofman, Sawyer, Witt & Oh, 2010; Jha et al., 2015; Linehan, 1993; Miller, Fletcher & Kabat-Zinn, 1995; Segal, Williams & Teasdale, 2012). Current study findings, in addition to this body of research, suggest that interventions targeting mindfulness skills in the context of military stressors may have some utility in preventing the development of PTSD and depressive symptoms.

Other significant contributors to PTSD and depressive symptoms in these data included age, Latino ethnicity, divorce/separation, and not having a college degree. These associations are consistent with past research (Hoge et al., 2004, 2008; Seal et al., 2009). As has been previously observed (Dohrenwend et al., 2008), Latino respondents in the current sample tended to be younger, which may account for a portion of their increased risk. Some of these characteristics or their underlying mechanisms of effect on mental health symptoms may be addressed through intervention, but others, like divorce, will for a variety of reasons likely prove difficult to address at scale. However, study results show that the magnitude of effect for demographic covariates is substantially lower than the effect for mindfulness and combat experiences.

Consistent with previous theoretical accounts of the role of mindfulness in the treatment of mental health symptoms, we suggest that the ability to pay nonjudgmental attention to internal states is a necessary component of self-regulation and healthy functioning following exposure to adverse experiences, particularly, as is the case for symptoms of PTSD and depression, when they are unpleasant. Conversely, deficits in mindfulness are associated with maladaptive approaches to coping with distress, like avoidance and suppression, which are linked to more severe symptoms (Gil, 2005; Morina et al., 2008; Silver et al., 2002; Tull et al., 2004). The large and significant proportion of variance in symptoms of PTSD and depression explained by mindfulness in this study supports the view that mindfulness is associated with adaptive coping in the context of adverse experiences. More research investigating the role of mindfulness in the development of mental health symptoms in the military context seems warranted to enhance resilience among this population.

It is important to note that some researchers and clinicians have argued that a mindful style of engagement diverges conceptually and practically from culturally congruent approaches to managing distressing emotions that characterize military coping styles, particularly among the combat arms specialties most likely to be exposed to intense fighting (Castro, Kintzle & Hassan, 2015). Consistent with recent approaches taken (Stanley, 2014), we suggest that mindfulness-based approaches to prevention and intervention in the military context must be framed as practical behavioral tools for adaptive management of thoughts and emotions associated with adverse experiences.

### **Limitations**

Analyses were performed on cross-sectional data, and causal relations between variables cannot be assumed. In addition, the CES is a self-report scale limited by recall of combat experiences that in some cases may have occurred up to 15 years ago. The MAAS, while a well validated and frequently used measure of mindfulness, does not capture nonjudgment or observing, describing, and participating dimensions of mindfulness. Rather, the MAAS captures attention control and awareness, which are necessary requirements for those dimensions.

### **Compliance with Ethical Standards**

**Conflict of Interests.** The authors have no conflicts of interest to report.

**Ethical Approval.** All procedures involving human participants were in accordance with the ethical standards of the institutional review board and with the 1964 Helsinki declaration and its later amendments.

**Informed Consent.** Informed consent was obtained from all study participants.

### **Author Contributions**

NB: designed and executed the study, conducted data analysis, and wrote the paper. MK: collaborated with the design and writing of the study. CAC: collaborated in study conceptualization, writing, and editing of the final manuscript. All authors approved the final version of the manuscript for submission.

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Table 1. Descriptive statistics

	N	%	Mean	SD
<b>Age</b>				
21 – 29	66	11.87		
30 – 39	273	49.10		
40 – 49	150	26.98		
50 – 59	51	9.17		
60 +	16	2.88		
<b>Race</b>				
White	273	49.10		
Black	59	10.61		
Latino	144	25.90		
Other	80	14.39		
<b>Gender</b>				
Male	444	79.86		
Female	111	19.96		
Transgender	1	0.18		
<b>Education</b>				
No degree	183	32.91		
College degree	294	52.88		
Grad degree	77	14.21		
<b>Marital Status</b>				
Single	97	17.48		
Married/Cohabiting	362	65.22		
Separated	96	17.29		
<b>Deployed</b>	486	87.52		
<b>Any Combat</b>	485	84.06		

<b>Total Combat Experiences</b>	553	6.50	4.02
<b>PCL-5</b>	530	38.16	20.26
<b>PHQ-9</b>	535	11.52	6.75
<b>MAAS</b>	538	3.33	1.00

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\*The PCL-5 refers to the PTSD Checklist for DSM-V; the PHQ-9 refers to the Patient Health Questionnaire-9; the MAAS refers to the Mindful Awareness and Attention Scale.

Table 2. Zero-order correlations for study variables

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) PTSD	1												
(2) Depression	0.86***	1											
(3) Combat experiences	0.43***	0.38***	1										
(4) Mindfulness	-0.75***	-0.73***	-0.37***	1									
(5) Age	0.09*	0.05	0.02	-0.00	1								
(6) Male	-0.01	-0.01	0.22***	0.01	-0.08	1							
(7) Black	-0.03	-0.02	-0.08	0.08	0.11*	-0.06	1						
(8) Latino	0.05	0.00	-0.01	0.01	-0.18***	0.04	-0.19***	1					
(9) Other race	-0.09*	-0.06	-0.04	0.09*	-0.02	0.04	-0.14**	-0.24***	1				
(10) Single	-0.07	-0.04	-0.10*	0.10*	-0.18***	-0.14**	0.08	0.07	0.12**	1			
(11) Separated/divorced	0.12**	0.15**	0.14**	-0.06	0.10*	-0.02	-0.02	0.02	-0.01	-0.19***	1		
(12) No degree	0.25***	0.22***	0.14**	-0.21***	0.00	-0.07	-0.06	0.09*	-0.06	-0.02	0.15***	1	
(13) Grad degree	-0.12**	-0.14**	-0.24***	0.11*	0.20***	-0.06	-0.05	-0.06	-0.00	0.01	-0.07	-0.29***	1

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Mindfulness derived from the MAAS; Combat experiences derived from the CES; PTSD derived from the PCL-5; Depression derived from the PHQ-9.

Figure 1. Sample composition

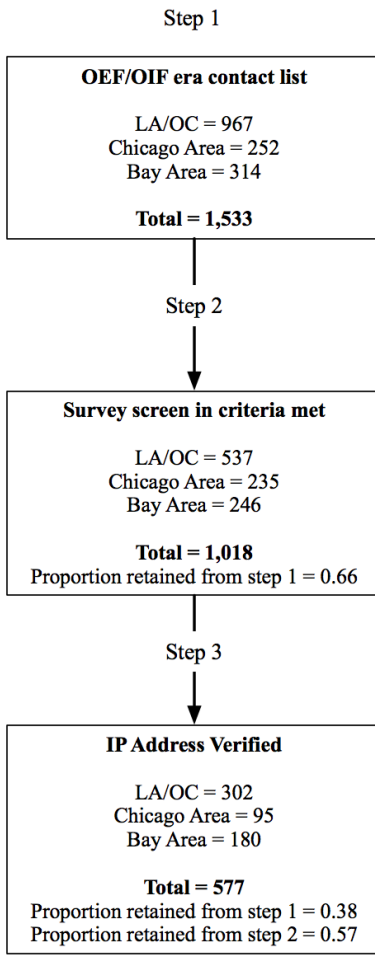


Table 3. Unstandardized parameter estimates, standard errors, and standardized parameter estimates for regression models

	PTSD			Depression		
	B (SE)	95%CI	$\beta$	B (SE)	95%CI	$\beta$
<b>Mindfulness</b>	-13.65 (0.63) ***	-14.88, -12.40	-0.67	-4.70 (0.22) ***	-5.12, -4.26	-0.69
<b>Combat Experiences</b>	0.91 (0.16) ***	0.60, 1.23	0.18	0.17 (0.06) **	0.06, 0.28	0.10
<b>Age</b>	0.24 (0.07) ***	0.11, 0.34	0.11	0.04 (0.02)	-0.01, 0.08	0.05
<b>Male</b> (ref female)	-1.20 (1.49)	-4.14, 1.74	-0.02	-0.13 (0.52)	-1.15, 0.89	-0.01
<b>Race</b> (ref White)						
Black	3.42 (1.97)	-0.44, 7.30	0.05	1.24 (0.69)	-0.11, 2.60	0.06
Latino	4.14 (1.41) **	1.36, 6.92	0.09	0.38 (0.50)	-0.59, 1.36	0.02
Other	0.62 (1.72)	-2.76, 3.99	0.01	0.39 (0.59)	-0.77, 1.55	0.02
<b>Marital status</b> (ref married / partner)						
Single	1.01 (1.60)	-2.12, 4.15	0.02	0.92 (0.56)	-0.17, 2.02	0.05
Divorced / separated	1.93 (1.63)	-1.28, 5.13	0.03	1.63 (0.56) **	0.54, 2.73	0.09
<b>Education</b> (ref college degree)						
No college degree	2.85* (1.30)	0.30, 3.61	0.07	0.65 (0.45)	-0.24, 1.54	0.05
Grad degree	0.11 (1.78)	-3.39, 3.61	0.00	-0.37 (0.61)	-1.57, 0.83	-0.02
<b>R<sup>2</sup></b>	0.61			0.57		

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Mindfulness derived from the MAAS; Combat experiences derived from the CES; PTSD derived from the PCL-5; Depression derived from the PHQ-9.



Figure 2. Path model one with standardized parameter estimates and 95% confidence intervals for outcome PTSD

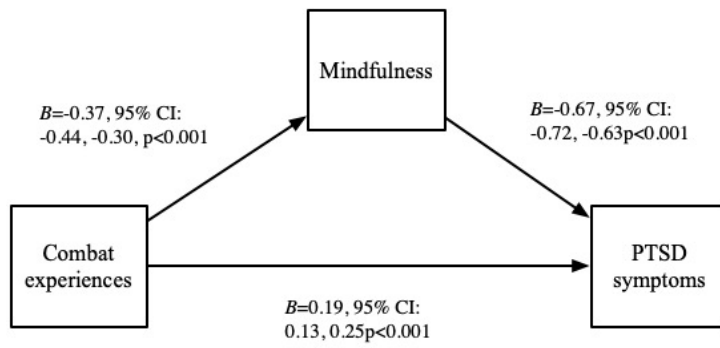


Figure 3. Path model two with standardized parameter estimates 95% confidence intervals for outcome depression

