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Exploration of the Influence of Childhood Trauma, Combat Exposure, and the Resilience Construct on Depression and Suicidal Ideation among U.S. Iraq/Afghanistan era Military Personnel and Veterans

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Abstract

OBJECTIVES—This study evaluated the effect of childhood trauma exposure and the role of resilience on both depressive symptoms and suicidal ideation.

METHODS—1488 military personnel and veterans, who served after September 2001, were evaluated for depressive, suicidal, and PTSD symptoms, combat exposure, childhood trauma exposure, and resiliency. Participants were enrolled as part of an ongoing multicenter study. Outcome measures were depressive symptoms and suicidal ideation.

RESULTS—After controlling for the effects of combat exposure and PTSD, results revealed that childhood trauma exposures were significantly associated with depressive symptoms and suicidal ideation. In addition, resilience was negatively associated with depressive symptoms and suicidal ideation, suggesting a potential protective effect.

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CONCLUSION—These findings suggest that evaluation of childhood trauma is important in the clinical assessment and treatment of depressive symptoms and suicidal ideation among military personnel and veterans.

Keywords

Psychological resilience; depressive disorder; suicide; combat disorders; child abuse; posttraumatic stress disorders

INTRODUCTION

Depression is a common cause of morbidity worldwide (Kessler et al., 2003; McKenna, Michaud, Murray, & Marks, 2005) and is associated with significant disease burden (Gadermann et al., 2012). Depression also contributes to mortality due to completed suicide (Zivin et al., 2007). Among males, deaths due to suicide are considerably higher among U.S. veterans compared to non-veterans (Kaplan, Huguette, McFarland, & Newsom, 2007). Thus, understanding the factors that contribute to depression and suicide, as well as the possible mediating factors (e.g., resilience) is of critical interest and serves as an important clinical priority in the treatment of military personnel and veterans.

Prior history of childhood trauma is an important risk factor for depression (Bernet & Stein, 1999; Duncan, Saunders, Kilpatrick, Hanson, & Resnick, 1996; Kendler, Kuhn, & Prescott, 2004; Molnar, Buka, & Kessler, 2001; Ritchie et al., 2009) and suicidal ideation, behavior, and attempts (Afifi et al., 2008; Mandelli, Carli, Roy, Serretti, & Sarchiapone, 2010; Nelson et al., 2002; Sarchiapone, Carli, Cuomo, & Roy, 2007; Sarchiapone, Carli, Giannantonio, & Roy, 2009) in civilians. This can include history of exposure to childhood physical abuse, childhood sexual abuse, and other significant childhood trauma (e.g., accidents, natural disasters, stranger violence). Both animal (Shannon et al., 2005) and human research suggest enduring psychological and biological effects of childhood trauma. One study found that peer-reared monkeys, (considered to be an analogue of childhood trauma) had a lower established serotonergic system level than maternally-raised monkeys (Mann, 2003). In humans, childhood trauma also has been shown to program the stress response systems, especially the hypothalamic-pituitary-adrenal (HPA) axis, to overreact to new stressors (Heim, Newport, Bonsall, Miller, & Nemeroff, 2001; Shea, Walsh, Macmillan, & Steiner, 2005; Teicher et al., 2003). Results from the National Comorbidity Survey showed a significant risk of depression in individuals (males: OR=1.8 [95% CI=0.9, 3.7]) and females: OR 1.8 [95% CI=1.4, 2.3]) (Molnar et al., 2001) with a reported history of childhood sexual abuse. Increased rates of depression have also been observed in childhood violence survivors (Duncan et al., 1996). Taken together, these studies suggest that childhood trauma exposure may be an important developmental contributor to depressive symptoms and suicidal ideation among military personnel.

Despite the evidence of increased risk of depressive symptoms and suicidal ideation among those exposed to childhood trauma, not all individuals who are exposed to childhood traumas develop psychological symptoms (Collishaw et al., 2007). This raises the possibility of contributory protective factors such as resilience. Resilience is defined by Connor and Davidson as “qualities that enable one to thrive in the face of adversity” (Connor & Davidson, 2003, p.76) and has been demonstrated to play an important role in PTSD prevention and recovery (Vaishnavi, Connor, & Davidson, 2007). It has also been suggested to be an important protective factor against the development of psychological symptoms in the face of adversity (Rutter, 1985). The central serotonergic function has been suggested to be related to resilience (Connor & Davidson, 2003), and in an initial study, venlafaxine was related to positive changes in resilience scores from pretreatment to post-treatment in

patients with PTSD (J. R. Davidson et al., 2005). Resilience has been inversely correlated in military veterans with the occurrence of and functional correlates of PTSD (Green, Calhoun, Dennis, & Beckham, 2010). Hence, further understanding of resilience, the factors contributing to it, and its impact on depressive symptoms and suicidal ideation is warranted.

The effect of resilience on the development and severity of depression and suicidal ideation in military personnel and veterans with childhood trauma exposure is largely unknown. In the current literature, we found only one related cross-sectional study of childhood trauma exposure, resilience and depressive symptoms. In 792 adult civilians with childhood trauma exposure, researchers (Wingo et al., 2010) found that childhood trauma was significantly associated with depressive symptoms and that resilience had an attenuating effect in decreasing depression. While these findings offer insight into the negative association between resilience and depressive symptoms in a disadvantaged civilian population, results are limited by a lack of controlling for the influence of PTSD symptoms. Evaluating the relationships between resilience and other outcomes among trauma exposed individuals may be particularly important as PTSD symptoms are significantly associated with childhood trauma (Breslau, 2002), depressive symptoms (Gros, Simms, & Acierno), and suicidal ideation (Guerra & Calhoun, 2010).

Although the results by Wingo and colleagues (2010) are significant, it is unknown whether these associations hold true among military personnel. Combat exposure may intensify the burden of trauma and negatively impact mental health outcomes. Severity of depressive symptoms may also be different among military personnel and veterans compared to civilians. To our knowledge, there are no studies that have addressed these issues in a military sample.

Therefore, the first aim of the current study was to evaluate the effect of childhood trauma (as a risk factor) on the severity of both depressive symptoms and suicidal ideation in military personnel and veterans who have served since September 11, 2001. The second aim of the study was to examine the possible role and interaction of resilience (as a protective factor) on depressive symptoms and suicidal ideation above and beyond the effect of combat exposure on depressive symptoms and suicidal ideation. We hypothesized that childhood trauma exposure would be positively associated with depressive symptoms and suicidal ideation in military personnel and veterans, while higher levels of resilience would attenuate depressive symptoms and suicidal ideation.

METHODS

Participants and Procedures

Measures in this study were collected as part of a multisite study designed to evaluate military personnel and veterans of the U.S. Armed Forces who served in the military on or after September 11, 2001. This study is conducted through the Department of Veterans Affairs (VA) Veterans Integrated Service Network (VISN) 6 Mental Illness Research, Education and Clinical Center (MIRECC). Institutional Review Board approval was obtained at all collaborating sites. After comprehensive description of the study and prior to study enrollment, written informed consents were provided by all participants. We enrolled 1488 U.S. Iraq/Afghanistan era military personnel between June 2005 and July 2010. Study participants were recruited through fliers, advertisements, invitational letters, and VA clinic referrals. Data were collected during one or two study visits and included completion of paper-and-pencil or computer-administered questionnaires and face-to-face psychiatric interviews with a doctoral psychologist or a master level clinician. All clinicians were supervised by licensed psychologists or psychiatrists.

Measures

Demographic information related to age, gender, race, education, and marital status were collected as part of study participation.

Depressive Symptom Severity—The Beck Depression Inventory – Second Edition (BDI-II) is a 21-item, forced-choice scale of severity of depressive symptoms. Each item represents a symptom of depression and contains a list of four statements of increasing severity. Each item is rated on a 0-3 scale with total scores ranging between 0 and 63. High internal consistency reliability of the BDI-II has been demonstrated (Cronbach's $\alpha = 0.96$ in the current sample).

In addition to the scale's utility as a unidimensional measure of depressive symptomatology, items load distinctly on two factors that capture cognitive and non-cognitive (somatic/affective) domains, (Beck, Steer, Ball, & Ranieri, 1996; Steer, Ball, Ranieri, & Beck, 1999a). Eight items comprise the cognitive dimension: pessimism, past failure, guilty feelings, punishment feelings, self-dislike, self-criticalness, suicidal thoughts or wishes, and worthlessness. The somatic/affective dimension is comprised of 13 items: sadness, loss of pleasure, crying, agitation, loss of interest, indecisiveness, loss of energy, changes in sleeping, irritability, changes in appetites, concentration difficulty, tiredness or fatigue, and loss of interest in sex (Steer et al., 1999a). Clinical cutoffs for these subscales have not been investigated, however the subscales have been identified as conceptually and statistically separate in previous factor analyses (Kumar, Steer, Teitelman, & Villacis, 2002; Speilberger, Ritterband, Reheiser, & Brunner, 2003). **Suicidal Ideation.** Severity of suicide ideation was assessed using the 21-item, self-report Beck Scale for Suicide Ideation (BSI) (Beck & Steer, 1991). Participants select statements that best describe their feelings over the past week. The first 19 items assess suicidal thoughts, intents, and plans. The number of previous suicide attempts and the seriousness of the attempt to die associated with last attempt are assessed in items 20 and 21. Item responses are rated on a 3-point scale ranging from 0 to 2 and then summed to arrive at a total score. The BSI has demonstrated strong internal consistency reliability (reported α coefficient between 0.90 and 0.97 (Beck, Steer, & Ranieri, 1988; Steer, Rissmiller, Ranieri, & Beck, 1993)). BSI has reasonable convergent, discriminative, and predictive validity (Beck et al., 1988) (Beck, Brown, & Steer, 1997; Brown, Beck, Steer, & Grisham, 2000; Cochrane-Brink, Lofchy, & Sakinofsky, 2000). Using survival analyses, Brown et al. (2000) determined that a cut-off score of 3 on the BSS yielded the highest hazard ratio in prediction of risk for actual suicide in a sample of almost 7000 psychiatric outpatients. This cut-off score is employed here to create a dichotomous index (2 OR 3) of "suicidality" (Brown et al., 2000). The BSI scores deviated markedly from normality in our sample, thus we employed this cut-off score to create a dichotomous index (2 OR 3) of "suicidality."

Childhood Trauma—The Traumatic Life Events Questionnaire (TLEQ) is a 23-item self-report questionnaire that assesses exposure to various traumatic events (Kubany et al., 2000). Content validity and reliability of the TLEQ have been well demonstrated (Clancy et al., 2006; Dedert et al., 2009; Kubany et al., 2000). The average convergent validity with an interview one week later for the TLEQ was 85% (range of 74% - 97% for individual items). The TLEQ was utilized to evaluate childhood trauma by generating the following three subscales: childhood exposure to physical violence, childhood sexual assault, and a subscale for "other" childhood trauma. Participants were counted as having childhood exposure to physical violence if they endorsed either item 12 or 13 (Kubany et al., 2000). Participants were counted as having childhood sexual assault if they endorsed either item 15, 16, or 17. Participants were rated as having exposure to "other" childhood trauma, if they endorsed any of the items 1-11, 19, or 22 before the age of 18. "Other" childhood trauma included

items such as trauma due to natural disasters, car accidents, other accidents, life-threatening illness etc. Table 1 shows the number of participants endorsing each childhood trauma category. If a particular traumatic event is endorsed, then respondents are also asked the following: 1) whether the event occurred before age 18 and 2) whether they responded with fear, helplessness, or horror (to discern whether that trauma met the threshold for DSM-IV Criterion A2 for PTSD).

Resilience. The Connor-Davidson Resilience Scale (CD-RISC) is a reliable (Cronbach's $\alpha = 0.96$ in the current sample) and valid (Connor & Davidson, 2003) instrument for measuring resilience. It consists of 25 items, with each item rated on a 5-point Likert scale as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The total score ranges from 0-100, with higher scores indicating greater resilience. The CD-RISC has demonstrated sound psychometric properties (Connor & Davidson, 2003) in studies of differing populations including community sample, primary care outpatients, general psychiatric outpatients, participants with generalized anxiety disorder, and PTSD. Moreover, the CD-RISC has demonstrated sensitivity to the effects of treatment with several therapies in clinical trials of PTSD patients (including sertraline, paroxetine, venlafaxine and CBT) (J. Davidson et al., 2008; J. R. Davidson et al., 2005).

Posttraumatic Stress Disorder (PTSD)—PTSD severity was assessed using the Davidson Trauma Scale (DTS) (J. R. Davidson et al., 1997; McDonald, Beckham, Morey, & Calhoun, 2009). The DTS is a brief global assessment scale for PTSD symptoms. It includes 17 items corresponding to the DSM-IV symptoms of PTSD. The 17 items are rated by both frequency and severity. Reliability and validity of the DTS has been demonstrated in veterans who have served since September 11, 2001 (McDonald et al., 2009).

Combat Exposure—Experiences of wartime stressors were assessed using the 7-item, self-report Combat Exposure Scale (CES). The CES is a widely used self-report scale that consists of 7-item wartime stressors. Responses to each item are divided into 5-point scales, with higher scores indicating greater exposure to combat. Respondents are asked to respond based on their exposure to various combat situations. The total CES score ranging from 0 to 41 is calculated by using the weighted sum of scores, which is classified into 1 of 5 categories of combat exposure, ranging from “light” to “heavy” (Keane et al., 1989). The CES has excellent test-retest and internal reliability (Keane et al., 1989).

Analysis Procedures

A series of linear regression equations were calculated to examine relationships between childhood trauma exposure, combat exposure, and resilience with depressive symptoms. Logistic regression analyses were conducted to test the relationships of childhood trauma exposure, combat exposure, and resilience with suicidal ideation as a dichotomous outcome. Given that demographic variables of age, gender and minority racial status have been differentially associated with suicidal variables (Crosby, Han, Ortega, Parks, & Gfroerer, 2011), all regression analyses are adjusted for these variables. Models also included PTSD symptoms, endorsement of childhood physical trauma, childhood sexual trauma, childhood other trauma, combat exposure, and interactions between trauma categories and resilience. Non-significant interactions were eliminated from the final models to reduce concerns with model overfitting. Multicollinearity statistics (i.e., VIF, tolerance) for all analyses were within the acceptable range. Statistical analyses were performed using SAS Version 9.2 for Windows (SAS Institute, Cary, NC).

We chose dimensional measure of depressive symptoms (rather than the diagnostic category) as an outcome measure to assess severity of symptoms in line with the upcoming

fifth edition of the Diagnostic Statistical Manual (DSM V). The DSM V proposes that dimensional assessment “provides additional information that assists the clinician in assessment, treatment planning, and treatment monitoring” (Helzer et al., 2008). In addition, assessing depression as a continuous variable (rather than categorical) will provide stronger statistical power for analysis and will allow for better exploration of the relationship with other continuous variables.

RESULTS

Sample Description

Demographic and clinical characteristics are shown in Table 1. Participants (N=1488) were primarily Caucasian (45.2%) or African American (47%) and had a mean age of 37.5 years ($SD = 10.1$). The majority of the sample was male (79.9%), married (53.6%), and employed (65.8%) and the mean education level was 13.52 ($SD = 3.3$) years. Eleven percent ($n=168$) of the study sample endorsed a history of childhood trauma and no combat trauma. Additionally, 652 participants reported no trauma history (i.e., no combat trauma and no childhood trauma). Of these, nearly 60% endorsed experiencing other trauma event types (e.g., a motor vehicle accident).

Association of Childhood Trauma with Depressive Symptoms after Accounting for PTSD

Table 2 provides a summary of linear regression analyses examining the predictive and moderating effect of childhood trauma exposure, combat exposure, resilience, and dependent variables: total depressive symptom severity, cognitive-related depressive symptoms, and somatic-affective-related depressive symptoms.

For the regression analyses examining total depressive symptom severity, female gender, childhood physical trauma, and combat exposure were positively associated with total depressive symptom severity. Moreover, Caucasian race, resilience, and the interaction between combat exposure and resilience were negatively associated with total depressive symptom severity. The significant interaction between combat exposure and resilience is illustrated in Figure 1. As shown, higher levels of resilience attenuated depressive symptoms, particularly among individuals with high combat exposure. Furthermore, the variables in the model for total depressive symptom severity accounted for 74% of the variance.

Results examining cognitive-related depressive symptoms indicated that younger age, Caucasian race, childhood physical trauma, childhood sexual trauma and childhood other trauma were associated with cognitive-related depressive symptoms. In addition, there were significant interactions noted for combat exposure and resilience, and other childhood trauma exposure and resilience for cognitive related depressive symptoms. The interaction pattern between trauma and resilience for cognitive related depressive symptoms followed the same configuration as displayed in Figure 1. Additionally, the total amount of variance accounted for by the variables in the statistical model was 59%.

Moreover, data revealed significant main effects of elevations on the somatic-affective subscale for female gender, combat exposure, and resilience. No interaction effects were observed. Collectively, the variables in the model for somatic-affective depressive symptoms accounted for 73% of the variance.

Association of Childhood Trauma with Suicidal Ideation after Accounting for PTSD

Multivariate logistic regression analyses (Table 3) were conducted to examine the relationship between childhood trauma exposure, combat exposure, resilience, and

potentially confounding variables (i.e. PTSD symptom severity) on suicidal ideation. The full model was shown to have a good fit (Hosmer and Lemeshow χ^2 goodness-of-fit test [$df = 8$] = 5.00; $p = .76$), with resilience, Caucasian race, and each childhood trauma type (physical, sexual, and other) significantly associated with severity of suicidal ideation. Controlling for other model variables, resilience was the strongest associated variable with suicidal ideation. Interactions between trauma exposures and resilience for suicidal ideation were not detected.

DISCUSSION

After adjusting for PTSD symptom severity and combat exposure, resilience was found to be significantly associated with all evaluated domains of depressive symptoms. Additionally, increased resilience was associated with lower suicidal ideation. Interactions with combat exposure and resilience were noted for both total depressive symptoms and cognitive depressive symptoms such that depressive symptoms were attenuated by resilience among those with higher trauma exposure. Generally, the presence of childhood trauma was significantly associated with increased total depressive and cognitive depressive symptoms. These study results confirm our initial hypotheses and suggest both resilience and childhood trauma are important in evaluating depressive symptoms and suicidal ideation in military personnel and veterans.

Depressive Symptom Severity

The current study finding that Caucasian race and female gender are positively and significantly associated with depressive symptoms is consistent with previous research in military samples. For example, a study conducted in 4,089 Iraq and Afghanistan active-duty soldiers indicated higher depression scores in Caucasians than in Blacks and Pacific Islanders (Lapierre, Schwegler, & Labauve, 2007). In a retrospective study of Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) veterans receiving medical treatment through the VA Connecticut Healthcare System ($n=1,229$), researchers observed a greater degree of positive screenings for depression among women than men (Haskell et al., 2010). Conversely, in non-military samples, the literature relating to gender and racial differences in depression have been mixed (Riolo, Nguyen, Greden, & King, 2005; Somervell, Leaf, Weissman, Blazer, & Bruce, 1989). The lack of consistency in reporting has been attributed largely to measurement differences across studies in depression (depressive symptoms vs. major depressive disorder; (Somervell et al., 1989)). Our research findings are also comparable to reports suggesting that resilience may serve as a protective factor in the occurrence of depressive symptoms. In a study of U.S. Iraq/Afghanistan era combat veterans ($n=497$), resilience was shown to mitigate to some degree the effects of higher combat exposure on the occurrence of PTSD along with potentially providing protective effects for depression and poorer functional outcomes (Green et al., 2010). A prospective study involving 475 combat-exposed, active duty Marines separating from service, found that resilience had a larger effect on individual functioning than on psychological symptoms independently (Hourani et al., 2012). Lastly, the interaction noted between combat exposure and resilience proved to be equivalent with other studies demonstrating the protective nature of resilience against high levels of trauma exposure (Green et al., 2010). Nonetheless, the current study and others have been largely cross-sectional; the directions of these effects need to be evaluated in longitudinal studies to determine causal effects.

Cognitive-related Depressive Symptoms

Consistent with the initial factor analytic study of the BDI-II, no relationship with gender was revealed for cognitive-related depressive symptoms scores (Steer, Ball, Ranieri, &

Beck, 1999b). The finding that all childhood trauma types were significantly associated with cognitive related depressive symptoms is consistent with current cognitive theories of depression. Trauma experienced during childhood results in a number of psychobiological consequences, which are often transposed in adulthood (Felitti et al., 1998). Moreover, these experiences substantially contribute to negative cognitions about self, resulting in negative feelings of self worth and low levels of self-esteem (Beck, 1963). These negative cognitions about self are often applied to perceptions about the world and one's future, and according to Beck (1963) are further characterized as depression (Beck, 1963; Beck, Brown, Steer, Eidelson, & Riskind, 1987).

Somatic-Affective Related Symptoms

After accounting for PTSD symptom severity, female gender and resilience were significantly associated with depressive symptoms, however, no effect of childhood trauma was detected. There are a number of possible explanations for this including 1) potential overlap among somatic-affective related symptoms with PTSD symptoms; 2) insufficient sample size; or 3) no true effect. Empirical data have supported that women generally report more bodily distress symptoms than men (Barsky, Peekna, & Borus, 2001) and that women are more likely to endorse somatic related symptoms of depression (Dekker, Koelen, Peen, Schoevers, & Gijsbers-van Wijk, 2007; Frank, Carpenter, & Kupfer, 1988; Marcus et al., 2005).

Severity of Suicidal Ideation

Comparable with our study findings, prior studies have consistently indicated a strong relationship between childhood trauma and suicidal ideation and/or attempts (Briere & Runtz, 1986; Read, Agar, Barker-Collo, Davies, & Moskowitz, 2001). A study of 17,337 adult outpatients in San Diego, California found that adverse childhood experiences in any trauma type increased the risk of attempted suicide 2- to 5-fold (Dube et al., 2001). After accounting for demographic variables and PTSD symptoms, severity of suicidal ideation was better associated with resilience than by race or types of childhood trauma.

Methodologic Limitations

The results of this study should be interpreted in light of the following limitations. First, this is a cross-sectional study; thus, study results cannot be interpreted as causative. Second, the possibility of other confounding effects could not be eliminated due to the observational design of the study. Third, suicidal ideation, not suicide attempts or completed suicide, was examined in this study. Although related, these constructs are distinct both in their prevalence, assessment and prediction (Goldstein, Black, Nasrallah, & Winokur, 1991). Current suicidal ideation is a variable included in the evaluation of suicide risk (American Psychiatric Association, 2003). Fourth, the potential recall bias of retrospective self-reporting of childhood abuse and trauma is inevitable in this type of study. However, Dube et al. showed good test-retest reliability of responses to retrospective childhood trauma, concluding that they are generally stable over time (Dube, Williamson, Thompson, Felitti, & Anda, 2004). Using documented cases of childhood trauma, inconsistencies in reported retrospective childhood trauma was shown to be largely due to under-reporting rather than over-reporting of the trauma (Della Femina, Yeager, & Lewis, 1990; Hardt & Rutter, 2004). Thus, the differences in reporting over time "would likely bias any associations found between these exposures and health outcomes towards the null" (Dube et al., 2004). As this sample included both active duty servicemembers and veterans, the results are more generalizable to the population of interest. However, given that there was a small representation of active duty servicemembers, possible military status differences could not be examined. It may be helpful to evaluate this in future research.

Conclusions

The study findings suggest that comprehensive assessment of both childhood trauma and resilience among military personnel and veterans can contribute to the understanding of their clinical status in terms of depression and suicidal ideation, and ultimately their clinical care. The clinical utility of these results is relevant to the following 3 areas: 1) it emphasizes the importance of clinical assessments of the degree of childhood trauma (as risk factor) and resilience (as protective factor) in military personnel and veterans with depression and/or suicidal ideation. 2) it highlights the importance of the implementation of prevention strategies for individuals with childhood trauma who are seen to be at more risk for depression and suicidal ideation. 3) it suggests that potential screening of military personnel and veterans for childhood trauma and its degrees may have implications in decreasing later depression and suicidal ideation.

While the results of our study are encouraging, further research is needed. A potential promising avenue for future research is to evaluate possible methods for boosting resilience through therapeutic interventions. For instance, initial work has shown that resilience can improve as a result of both psychological (Leve, Fisher, & Chamberlain, 2009; Stallard et al., 2005) and pharmacological (J. R. Davidson et al., 2005) interventions. Further interventional research in this area is still needed to be done. Resilience-enhancing intervention may have a preventative or prophylactic role against depressive and suicidal ideation. These data may also have implications in treatment policy. Both the Department of Veterans Affairs and the Department of Defense (DoD) have current efforts underway to potentially increase resiliency among active duty soldiers (Reivich, Seligman, & McBride, 2011) and veterans (Bates et al., 2010). Increasing resilience to mitigate the negative impact of developmental trauma on depressive symptoms and suicidal ideation is relevant to further development of psychological and pharmacological interventions. However, the empirical evidence is nascent, and it remains a question as to whether resilience (as a state, trait or process) can be significantly modified to reduce depression and suicidal ideation and improve functioning among individuals with trauma exposure. Future studies are needed to address these questions as well to replicate these findings in a prospective study. In addition, further examination of this line of research might lead to important preventative and treatment modalities above and beyond symptom control.

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Figure 1. Interaction of Combat Exposure by Resilience on Depressive Symptoms ^{*†}

This figure shows the interaction of combat exposure X resilience on Depressive Symptoms as the outcome measure.

*In order to aid with visualizing the interaction between combat exposure and resilience, we divided participants into three levels of resilience using the percentile of their CD-RISC score. The high resilience level consisted of participants with Connor-Davidson Resilience scale (CDRISC) scores ≥ 75th percentile. The medium resilience level consisted of participants with CDRISC scores < 25th percentile and < 75th percentile. The low resilience level consisted of participants with CDRISC scores < 25th percentile.

† BDI=Beck Depression Inventory; CES=Combat Exposure Questionnaire.

Table 1

Demographic and Clinical Characteristics of the Total Sample of Iraq and Afghanistan Era Military Personnel and Veterans (N=1488)

Variable	Total Sample
Age, mean (SD), <i>y</i>	37.52 (10.0)
Education, mean (SD), <i>y</i>	13.52 (3.3)
Gender, n (%) male	1189 (79.9)
Race, n (%)	
White (<i>including white Hispanic</i>)	673 (45.2)
Black or African American	699 (47.0)
Other	116 (7.8)
Marital Status, n (%)	
Married (not separated)	797 (53.6)
Divorced or separated	336 (22.6)
Others (widowed or never married)	352 (23.7)
Employment Status, n (%) working	979 (65.8)
Military Status, n (%)	
Active duty	79 (5.3)
Reserve forces duty	100 (6.7)
Discharged	814 (54.7)
Retired	212 (14.3)
Beck Depression Inventory	14.42 (12.6)
Cognitive Subscale, mean (SD)	4.13 (4.7)
Somatic-Affective Subscale, mean (SD)	10.3 (5.8)
Beck Scale for Suicide Ideation	1.13 (3.6)
Score of 3 or greater, mean (SD), n (%)	10.29 (5.8), 151 (9.9)
Combat Exposure Scale score, mean (SD)	11.94 (10.9)
No combat exposure (0), n (%)	333 (22)
Light to light-moderate (1-16), n (%)	646 (43.4)
Moderate (17-24), n (%)	263 (17.7)
Moderate-heavy to heavy (25-41), n (%)	245 (16.5)
Davidson Trauma Scale score, mean (SD)	42.29 (40.4)
Conner-Davidson Resilience Scale score, mean (SD)	72.59 (18.1)
Traumatic Life Events Questionnaire (TLEQ)	
No childhood trauma history, n (%)	652 (43.8)
Childhood physical assault, n (%)	505 (33.9)
Childhood sexual assault, n (%)	190 (12.8)
Other childhood psychological trauma, n (%)	577 (38.8)

Table 2
Linear Regression Results Examining the Association between Childhood Trauma, Combat Exposure, Resilience, and Depressive Symptom Severity (N=1488*)

Dependent Variable	Model R ²	Variable	β	SE	B [†]	P
Depressive Symptoms	0.74	Age	-0.005	0.017	-0.004	0.76
		Gender	1.413	0.458	0.045	0.002
		Minority	-0.857	0.354	-0.034	0.02
		PTSD	0.194	0.006	0.621	<0.001
		Childhood, physical	0.867	0.374	0.033	0.02
		Childhood, sexual	0.655	0.547	0.017	0.23
		Childhood, other	0.690	0.365	0.027	0.06
		CES	0.172	0.063	0.149	0.007
		CD-RISC	-0.190	0.015	-0.272	<0.001
		CES × CD-RISC	-0.002	0.001	-0.137	0.010
Cognitive Subscale (N=1487)	0.59	Age	-0.019	0.008	-0.040	0.018
		Gender	-0.261	0.212	-0.022	0.22
		Minority race	-0.389	0.164	-0.042	0.018
		PTSD	0.055	0.003	0.479	<0.001
		Childhood, physical	0.610	0.173	0.062	0.0005
		Childhood, sexual	0.526	0.254	0.038	0.04
		Childhood, other	1.835	0.670	0.192	0.006
		CES	0.078	0.030	0.184	0.008
		Resilience	-0.070	0.008	-0.272	<0.001
		CES × CD-RISC	-0.001	0.0004	-0.220	0.001
		Childhood, other x CD-RISC	-0.022	0.009	-0.171	0.02
Somatic-Affective (N=1487)	0.73					
		Age	0.015	0.012	0.017	0.22
		Gender	1.664	0.315	0.078	<0.001

Dependent Variable	Model R ²	Variable	β [†]	SE	B [‡]	P
		Minority race	-0.437	0.243	-0.026	0.07
		PTSD	0.139	0.004	0.656	<0.001
		Childhood, physical	0.250	0.257	0.014	0.33
		Childhood, sexual	0.129	0.376	0.005	0.73
		Childhood, other	0.408	0.250	0.023	0.10
		CES	0.031	0.013	0.039	0.02
		CD-RISC	-0.123	0.008	-0.259	<0.001

Note. PTSD= Posttraumatic Stress Disorder, CES= Combat Exposure Scale, CD-RISC= Connor Davidson Resilience Scale.

* Number of observations with missing values =1

[†]Parameter estimate

[‡]Standard estimate.

Table 3

Logistic Regression Model Predicting Suicidal Ideation

Variable	β	SE	Wald χ^2	OR	95% CI
Age	0.00495	0.0104	0.2252	1.005	0.985-1.026
Gender	-0.2409	0.2821	0.7294	0.786	0.452-1.366
Minority race	-0.6394	0.2083	9.4204	0.528 *	0.351-0.794
PTSD ^a	0.0232	0.00329	49.7908	1.023 **	1.017-1.030
Childhood, physical	0.4898	0.2045	5.7377	1.632 *	1.093-2.437
Childhood, sexual	0.6841	0.2629	6.7729	1.982 *	1.184-3.318
Childhood, other	0.4772	0.2034	5.5052	1.612 *	1.082-2.401
CES	0.0131	0.0105	1.5783	1.013 *	0.993-1.034
CD-RISC	-0.0356	0.00596	35.6555	0.965 **	0.954-0.976

Note. N=1488. CI= Confidence interval; PTSD= Posttraumatic Stress Disorder, CES= Combat Exposure Scale, CD-RISC= Conner Davidson Resilience Scale.

* p<05.

** p<001 **