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Examining the Relation Between Posttraumatic Stress Disorder and Suicidal Ideation, in an OEF/OIF Veteran Sample

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Abstract

This study examined the relation between posttraumatic stress disorder (PTSD) and suicidal ideation among U.S. military veterans deployed during Operation Enduring Freedom and/or Operation Iraqi Freedom. Specific aims included investigation of (1) whether PTSD was associated with suicidal ideation after controlling for combat exposure and history of suicide attempt(s), (2) whether PTSD was associated with suicidal ideation absent a co-occurring depressive disorder (MDD) or alcohol use disorder (AUD), (3) whether co-occurring MDD or AUD increased risk of suicidal ideation among those with PTSD, and (4) whether PTSD/MDD symptom clusters were differentially associated with suicidal ideation. Results pointed to unique effects associated with prior suicide attempt(s), PTSD, and MDD. PTSD-diagnosed participants with co-occurring MDD or AUD were not significantly more likely to endorse suicidal ideation than PTSD-diagnosed participants without such comorbidity. The ‘emotional numbing’ cluster of PTSD symptoms and the ‘cognitive-affective’ cluster of MDD symptoms were uniquely associated with suicidal ideation.

Keywords

posttraumatic stress disorder; trauma; suicide; OEF-OIF; military

1. Introduction

A report from the Institute of Medicine (2008) concluded that there is compelling empirical evidence of a link between deployment to a war zone and an elevation of suicide risk subsequent to that deployment. It is likely that this link is largely mediated by compromised emotional-behavioral health, as suicide has long been understood to occur most often in the context of psychiatric illness (Barraclough, Bunch, Nelson, & Sainsbury, 1974; Fontana & Rosenheck, 1995; Henriksson, Aro, Marttunen, & Heikkinen, 1993; Shafii, Carrigan,

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Whittinghill, & Derrick, 1985). Exposure to wartime stressors may precipitate a range of aversive psychological sequelae, prominent among which are symptoms of posttraumatic stress disorder (Hoge et al., 2004; Schlenger, Kulka, Fairbank, & Hough, 1992). Estimates of the prevalence of posttraumatic stress disorder (PTSD) in combat veterans range considerably. With respect to deployments associated with Operations Enduring Freedom and Iraqi Freedom (OEF/OIF), surveys have found that 11 to 30 percent of returning veterans meet screening criteria for PTSD (Hoge et al., 2004; Lapierre, Schwegler, & LaBauve, 2007; Milliken, Auchterlonie, & Hoge, 2007).

Previous studies have found PTSD to be significantly associated with elevated suicide ideation and suicide attempts (e.g., Davidson, Hughes, Blazer, & George, 1991; Jakupcak et al., 2009; Marshall et al., 2001; Sareen et al., 2007). A number of questions remains regarding the relation between PTSD and suicidality, however, several of which were tackled by the study presented here. The specific aims of this investigation, conducted with a sample of OEF/OIF veterans, were to consider (a) whether PTSD is associated with suicidal ideation after first accounting for veterans' prior suicide attempts and combat history, (b) whether PTSD is associated with suicidal ideation absent the diagnosis of a co-occurring major depressive disorder (MDD) or alcohol use disorder (AUD), (c) whether PTSD-diagnosed participants with co-occurring MDD or AUD are more likely to report suicidal ideation than PTSD-diagnosed participants who do not manifest such comorbidity, and (d) whether, among PTSD-diagnosed participants, there are distinct clusters of symptoms differentially associated with suicidal ideation.

1.1. Comorbidity and suicidality

PTSD commonly co-occurs with other psychiatric illnesses. Epidemiological findings suggest that the DSM-IV Axis I psychiatric diagnoses most frequently comorbid with PTSD are MDD and AUD (Keane & Wolfe, 1990; Kessler, Sonnega, Bromet, & Hughes, 1995; Stewart, 1996). Like PTSD, both MDD and AUD have been found to be robust predictors of elevated suicidality (Borges, 2000; Henriksson et al., 1993; Liu, Gentzler, George, & Kovacs, 2009; Yen et al., 2003). Evidence that PTSD regularly co-occurs with disorders that are themselves associated with suicidality raises two questions. First, does PTSD predict increased suicidality absent a comorbid diagnosis of MDD or AUD? Second, are persons diagnosed with PTSD and a co-occurring MDD or AUD at greater risk of suicidality than PTSD-diagnosed persons who do not concurrently struggle with MDD and/or AUD?

There are limited data that speak directly to the question of whether suicidality is heightened among PTSD-diagnosed persons who do not manifest other clinical risk factors (e.g., MDD/AUD). Instead, investigators interested in the link between PTSD and suicidality have typically employed statistical approaches that partial out effects associated with other mental health disorders, such that a relation between PTSD and suicidality may be said to exist after "controlling"/"adjusting" for variance in suicidality that may be explained by other disorders included in the analysis (e.g., Marshall et al., 2001; Sareen, Houlahan, Cox, & Asmundson, 2005). With respect to the second question, which asks whether there is an incremental risk of suicidality associated with comorbidity among those diagnosed with PTSD, more data are available. Across four studies (Ferrada-Noli, Asberg, Ormstad, Lundin, & Sundbom, 1998; Jakupcak et al., 2009; Shalev et al., 1998; Tarrier & Gregg, 2004), participants diagnosed with both PTSD and MDD did not endorse significantly greater suicidal ideation than participants with PTSD only, and in one study (Jakupcak et al., 2009), participants diagnosed with both PTSD and an AUD (alcohol abuse) did not endorse significantly greater suicidal ideation than participants with PTSD only.¹

1.2. Symptom clusters and suicidality

Among persons diagnosed with PTSD, frequency and intensity of specific symptoms of PTSD vary markedly. Similarly, although it is common for PTSD-diagnosed persons to endorse symptoms of MDD, there is considerable variability in the type and severity of depressive symptomatology experienced. Taxometric work points to distinct clusters of both PTSD and MDD symptoms; the present report considers whether these symptom clusters are differentially associated with suicidal ideation.

With respect to PTSD, factor analyses most often suggest four symptom clusters, which describe, in turn, symptoms related to (1) the re-experiencing of the trauma, (2) the experiential and behavioral avoidance of trauma-related stimuli, (3) a general numbing of responsiveness, and (4) hyperarousal (Asmundson et al., 2000; Cox, Mota, Clara, & Asmundson, 2008; King, Leskin, King, & Weathers, 1998; McDonald et al., 2008). Factor analyses of depressive symptomatology suggest that symptoms of MDD cluster into cognitive-affective and somatic-vegetative symptoms, respectively (Beck, Steer, Ball, & Ranieri, 1996; Dozois, Dobson, & Ahnberg, 1998; Steer, Ball, Ranieri, & Beck, 1999).

Several studies have examined the relation of PTSD or MDD symptom clusters (or specific symptoms) to suicidality among persons diagnosed with PTSD, with mixed results. Hendin and Haas (1991) reported that the experience of “persistent guilt” contributed uniquely to the prediction of both suicidal ideation and suicide attempts in a sample of PTSD-diagnosed Vietnam combat veterans; no specific symptoms of PTSD (per DSM-III-R criteria) were uniquely predictive of suicidality. Bell and Nye (2007), also studying PTSD in Vietnam combat veterans, focused exclusively on the relative import of the three PTSD symptom clusters delineated in DSM-IV, and found that only re-experiencing symptoms were uniquely, positively predictive of suicidal ideation. Finally, Tarrier and Gregg (2004) reported evidence of univariate relations between suicidality and the PTSD symptom clusters of re-experiencing and hyperarousal in a sample of PTSD-diagnosed civilians, but neither of these symptom clusters was uniquely associated with suicidality in multivariate analyses.

1.3. The present investigation

In order to address the questions raised above, the present study examined (1) the relation of PTSD to suicidal ideation, with specific attention to the import of psychiatric comorbidity, and (2) the relation of PTSD/MDD symptom clusters to suicidal ideation among PTSD-diagnosed participants, with specific attention to those symptom clusters identified robustly across recent taxometric work. Note that determination of participants' status vis-à-vis each psychiatric disorder of focus (i.e., PTSD; MDD; AUD) was made using a psychometrically well-established structured clinical interview that was developed consistent with DSM-IV-TR criteria; many of the studies referenced above determined participants' diagnostic status using questionnaire data (e.g., Jakupcak et al., 2009; Marshall et al., 2001) or DSM-III-R diagnostic criteria (e.g., Hendin & Haas, 1991; Shalev et al., 1998; Tarrier & Gregg, 2004).

It was hypothesized that PTSD would be associated with increased risk of suicidal ideation after accounting for participants' history of combat exposure and history of suicide attempts. It was hypothesized that PTSD would be associated with increased risk of suicidal ideation even absent a co-occurring MDD or AUD diagnosis. Moreover, consistent with the extant, albeit limited, research referenced above, dually-diagnosed participants were not expected to be at increased risk of suicidal ideation relative to participants diagnosed only with PTSD.

¹In contrast, there are data suggesting that persons dually diagnosed with PTSD and MDD may be at greater risk of engaging in suicidal acts than persons diagnosed with MDD only (Marshall et al., 2001; Oquendo et al., 2005).

With respect to questions regarding the relative strength of relations between symptom clusters and suicidal ideation among PTSD-diagnosed participants, no a priori hypotheses were generated.

2. Method

2.1. Participants

Participants were drawn from the Mid-Atlantic Mental Illness Research, Education and Clinical Center (MIRECC) Recruitment Database for the Study of Post-Deployment Mental Health (the “Registry”). To be eligible for inclusion in the Registry, an individual must be a veteran of the U.S. Armed Forces who served in the military subsequent to September 11, 2001. Eligible veterans were recruited to the Registry through mailings, advertisements, and clinician referrals. The text of recruitment materials did not reference specific symptoms or diagnoses. For example, the research was described in one brochure thus: “This research study is concerned with the effects of recent military deployments on the mood, emotions, and mental and physical health of military personnel.” An alternate mailing included the following text: “We invite you to participate in a study we are doing about the effects of recent deployments on the physical and mental health of service members, especially as they transition from deployment back to civilian life.” Participants were paid \$175 for completion of a structured clinical interview and battery of questionnaires addressing a range of possible post-deployment problems.

The current report includes data from veterans recruited to the Registry between June 2005 and August 2008 who were (a) deployed to a region of conflict during Operation Enduring Freedom and/or Operation Iraqi Freedom, and (b) administered measures, described below, of both suicidal ideation and pertinent DSM-IV psychiatric illnesses (i.e., PTSD, MDD, AUD). Application of these inclusion criteria resulted in a sample of 393 veterans, approximately 82% ($n = 322$) of whom were male. These veterans ranged in age from 22 to 65 years old, with an average age of 38.3 ($SD = 10.2$). The sample was comprised largely of Caucasian ($n = 186$) and African-American ($n = 175$) participants, with smaller numbers of Hispanic ($n = 14$), Native American ($n = 11$), and other minority populations ($n = 7$) represented.

2.2. Procedure

Participants provided written informed consent after being provided with both verbal and written description of the research being conducted. Participants were then administered a diagnostic structured clinical interview, along with a battery of questionnaires related to a range of possible post-deployment adjustment problems. Demographic information was also collected. Participants were debriefed and provided with diagnostic feedback and appropriate clinical referrals. This research was approved by the Institutional Review Boards of the participating medical centers, located in North Carolina and Virginia.

2.3. Measures

2.3.1. Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID-I; First, Spitzer, Williams, & Gibbon, 2002)—PTSD, MDD, and AUD (i.e., alcohol abuse; alcohol dependence) diagnoses were determined using the SCID-I semi-structured clinical interview developed to diagnose Axis I psychiatric disorders. The SCID-I was administered by trained master's- or doctorate-level research personnel, all of whom received extensive training and supervision. Reliability of interviewers scoring a series of seven SCID-I training videos was excellent (Fleiss' kappa = 0.95).

2.3.2. Beck Scale for Suicide Ideation (Beck & Steer, 1991)/Scale for Suicide Ideation-Adapted—

Suicidal ideation was assessed using one of two self-report instruments modeled closely upon the clinician-administered Scale for Suicide Ideation (SSI; Beck, Kovacs, & Weissman, 1979). As part of the initial research protocol, study participants were administered an unpublished adaptation of the SSI (SSI-A). Subsequent to a protocol change, study participants were instead administered the Beck Scale for Suicide Ideation (BSS), an adaptation of the SSI published by Beck and Steer (1991). In total, 52% of participants ($n = 204$) were administered the BSS. Both the BSS and SSI-A are comprised of 21 items. Items on the BSS survey the same content as corresponding items on the SSI-A, and the response scales are identical (described below). The BSS and SSI-A are distinguished only by item format. Specifically, each BSS item presents a series of three statements, and respondents are asked to endorse the statement that best applies to them (e.g., “I have no wish to die”; “I have a weak wish to die”; “I have a moderate to strong wish to die”); each SSI-A item instead presents a question (e.g., “How strong is your wish to die?”), and participants are instructed to endorse one of three possible response choices (e.g., “no wish to die”; “weak wish to die”; “moderate to strong wish to die”). Items 1-19 pertain to current suicidal thoughts, intent, and planning; item responses are scored from 0 – 2, and then summed to arrive at a total suicidal ideation score (possible range: 0 – 38).

The BSS has demonstrated strong internal reliability, with reported coefficient alphas ranging from .90 to .97 (Beck, Steer, & Ranieri, 1988; Steer, Rissmiller, Ranieri, & Beck, 1993), and there is evidence of the instrument's convergent, discriminative, and predictive validity (Beck, Brown, & Steer, 1997; Beck et al., 1988; Brown et al., 2000; Cochrane-Brink, Lofchy, & Sakinofsky, 2000). Psychometric data on the SSI-A have not been previously published; however, support for the internal reliability of SSI-A was obtained in the present study ($\alpha = .88$). To examine the measurement equivalence of the BSS and SSI-A, bivariate correlations between SSI-A scores and scores on measures of depressive and PTSD symptoms (described below) were compared to bivariate correlations between BSS scores and scores on measures of depressive and PTSD symptoms. These comparisons were accomplished by applying Fisher's z transformation to the correlation coefficients, and then employing Fisher's z test (two-tailed). No significant differences were obtained.

Using survival analyses, Brown and his colleagues (2000) determined that a cutoff score of 3 on the BSS yielded the highest hazard ratio in prediction of risk for actual suicide in a sample of almost 7,000 psychiatric outpatients. This cutoff score is employed here to create a dichotomous index (2 OR 3) of “suicidality”. Items 20 and 21 probe about participants' history of suicide attempts, if any. Responses to these items are captured here by the dichotomous variable “suicide attempt history,” which indexes whether or not respondents reported a prior suicide attempt.

2.3.3. Beck Depression Inventory - Second Edition (BDI-II; Beck, Steer, & Brown, 1996)—

Participants' depressive symptomatology was assessed using the BDI-II, a 21-item self-report questionnaire designed for use by both clinical and nonclinical adult populations. Higher item scores are indicative of greater depressive symptomatology. In analyses reported below, the BDI-II suicidality item was dropped, so as to avoid content overlap with the BSS. The BDI-II's reliability and validity has been demonstrated across numerous studies (Beck, Steer, Ball, et al., 1996; Beck, Steer, & Brown, 1996; Dozois et al., 1998; Steer et al., 1999).

In addition to evidence of the scale's utility as a unidimensional index of depressive symptomatology, psychometric data suggest that that items load distinctly on two factors, capturing cognitive-affective and somatic-vegetative symptoms, respectively (Beck, Steer, Ball, et al., 1996; Dozois et al., 1998; Steer et al., 1999). In addition to BDI-II total scores,

analyses examined the two-factor solution identified by Dozois et al. (1998), wherein 9 items comprise the cognitive-affective factor (excluding the suicide item) and 11 items comprise the somatic-vegetative factor.

2.3.4. Davidson Trauma Scale (DTS; Davidson, Book, Colket, & Tupler, 1997)—

The DTS is a 17-item self-report inventory of PTSD symptoms, the content of which corresponds to the 17 symptoms identified as diagnostic criteria for PTSD in the DSM-IV. Respondents provide ratings of both symptom frequency and intensity on 5-point Likert scales, and a total symptom severity score is arrived at by summing these frequency and intensity ratings. In analyses reported below, the item assessing whether respondents have a sense of a foreshortened future was dropped, in order to reduce the likelihood of obtaining a spurious association between DTS and BSS scores. In addition to a total severity score, subscale scores were tabulated for each of four symptom clusters identified through factor analysis in previous research (e.g., Cox et al., 2008; McDonald et al., 2008), describing criteria related to the re-experiencing of the trauma, experiential/behavioral avoidance, emotional numbing, and hyperarousal, respectively.² The reliability and validity of the DTS is well-documented (Davidson et al., 1997; Davidson, Tharwani, & Connor, 2002; McDonald et al., 2008; McDonald, Beckham, Morey, & Calhoun, 2009).

2.3.5. Combat Exposure Scale (CES; Keane et al., 1989)—Combat exposure was assessed with the CES, a 7-item face valid measure of the extent and intensity of an individual's exposure to combat during military service. Responses to each item are provided on 5-point Likert scales, with higher scores reflective of greater exposure to combat. The CES has been found to demonstrate excellent test-retest and internal reliability (Keane et al., 1989).

2.4. Data analytic strategy

Logistic regression models were employed to test whether variables of interest predicted a heightened risk of suicidality, operationally defined as a BSS/SSI-A total score of 3 or greater (see above). In these analyses, a conservative approach to modeling the effects of clinical variables on suicidality was adopted, whereby effort was made to first establish, and to account statistically for, effects associated with participants' demographic characteristics, combat exposure, and history of suicide attempts. Odds ratios (ORs) obtained as a result of model estimation are presented, along with associated 95% confidence intervals (CIs). Significance testing was performed using the Wald chi-square statistic ($p < .05$).

3. Results

3.1. Summary statistics

Table 1 presents descriptive statistics for the full sample. Approximately 12% of the sample ($n = 45$) obtained BSS/SSI-A total scores of 3 or greater. With respect to the diagnoses of focus in the current study, approximately 36% of the sample ($n = 143$) met criteria for PTSD, 22% of the sample ($n = 88$) met criteria for MDD, and 4% of the sample ($n = 17$) met criteria for an AUD. Note, finally, that just under 9% of the sample ($n = 34$) reported a prior suicide attempt.

²Anhedonia, insomnia, and diminished concentration appear among the DSM-IV diagnostic criteria for both PTSD and MDD, and as such, are assessed with items on both the BDI-II and the DTS. Scores on BDI-II items assessing these symptoms load together on the somatic-vegetative factor. Scores on DTS items assessing insomnia and diminished concentration load on the hyperarousal factor, while scores on the DTS item assessing anhedonia load on the emotional numbing factor.

3.2. Psychiatric diagnoses and suicidality

In preliminary analyses, a series of bivariate logistic regression models was estimated with the full sample; suicidality was regressed onto participants' age, gender, race, marital status, suicide attempt history, and standardized CES scores, respectively. None of the demographic variables were associated with participants' reported suicidality. However, the report of a prior suicide attempt was positively associated with suicidality, OR = 5.4; CI, 2.4 – 11.9; $\chi^2(1) = 17.50, p < .0001$, as was a greater level of exposure to combat, OR = 1.7; CI, 1.2 – 2.3; $\chi^2(1) = 10.51, p = .001$.

Next, three logistic regression models were estimated for the purpose of examining prediction of suicidality from SCID-I diagnoses of PTSD, MDD, and AUD, respectively, while accounting for effects associated with suicide attempt history and CES scores. In these single-diagnosis models, PTSD was associated with heightened suicidality, AOR = 4.9; CI, 2.3 – 10.6; $\chi^2(1) = 16.73, p < .0001$, as was MDD, AOR = 3.4, CI, 1.7 – 6.7; $\chi^2(1) = 12.79, p < .001$. An AUD diagnosis, however, was not associated with an increased probability of suicidality, AOR = 1.6, CI, 0.5 – 5.2; $\chi^2(1) = .65, p = .42$.

Two multivariate logistic regression analyses were then conducted to examine whether participants dually diagnosed with PTSD and either MDD or AUD reported significantly greater suicidality than persons diagnosed with PTSD alone. In each analysis, suicidality was regressed on 'diagnostic status', a 4-level variable created to index the presence (+) or absence (–) of diagnoses pertinent to the model being estimated. Participants' combat exposure (CES scores) and suicide attempt history were included as covariates in these analyses. Results point, first, to the significant relation between PTSD and heightened suicidality, even in the absence of MDD (Table 2, Model a) or AUD (Table 2, Model b). While there appears to be a trend for those with comorbid PTSD and MDD to endorse greater suicidality than those with PTSD alone (see Table 2, model a), the contrast comparing these diagnostic presentations was not statistically significant, AOR = 1.6, CI, .7 – 3.5; $\chi^2 = 1.28, p = .26$. Similarly, a diagnostic presentation of comorbid PTSD and AUD did not confer additional risk of suicidality, relative to a presentation of PTSD absent AUD, AOR = 1.2, CI, .3 – 4.9; $\chi^2 = .05, p = .82$.

3.3. Symptom clusters and suicidality among participants diagnosed with PTSD

Association between symptom clusters and suicidality was examined among participants with PTSD (N = 143). Table 3 presents bivariate correlations between suicidality, DTS scores, and BDI-II scores. Zero-order relations between suicidality and both BDI-II and DTS scores were of modest to moderate magnitude ($r_{pb} = .23 - .40$). Bivariate relations between PTSD symptom clusters (DTS factors) and MDD symptom clusters (BDI-II factors) were of modest to moderately large magnitude ($r = .33 - .66$).

As in the full sample, no demographic variables were associated with suicidality in bivariate logistic regression analyses. Also consistent with results obtained in the full sample, the report of a prior suicide attempt was predictive of an increased likelihood of current suicidality, OR = 2.9; CI, 1.1 – 7.7; $\chi^2(1) = 4.66, p = .03$. CES scores, however, were not significantly predictive of suicidality among those with PTSD, OR = 1.0; CI, 0.9 – 1.1; $\chi^2(1) = 2.28, p = .13$.

Next, a multivariate logistic regression model was estimated in order to investigate whether the risk of suicidality among PTSD-diagnosed participants was related to the overall severity of reported PTSD and/or depressive symptomatology. Predictor variables in this model were participants' suicide attempt history, standardized BDI-II total scores, and standardized DTS

total scores. As presented in Table 4 (model a), heightened depressive and PTSD symptomatology were each uniquely associated with an increased probability of suicidality.

A final multivariate logistic regression model was then estimated for the purpose of examining whether suicidality among PTSD-diagnosed participants was uniquely associated with specific PTSD and MDD symptom clusters. Predictor variables included participants' suicide attempt history, standardized DTS scores for each PTSD symptom cluster (re-experiencing; avoidance; numbing; hyperarousal), and standardized BDI-II scores for each MDD symptom cluster (cognitive-affective; somatic-vegetative). Results of model estimation are presented in Table 4 (model b). The overall model was significant, $\chi^2(7) = 23.84, p = .0012$. Note that the numbing cluster of PTSD symptoms and the cognitive-affective cluster of MDD symptoms were the only predictors uniquely associated with suicidality. Given the magnitude of bivariate correlations between predictors in this model (see above), diagnostics were run to gauge the extent to which multicollinearity might be compromising the reliability of obtained results. The obtained tolerance coefficients (.33) and condition indices (.4.18) were not suggestive of significant collinearity problems.

4. Discussion

This research adds to mounting evidence that PTSD is associated with an increased risk of suicidality (e.g., Davidson et al., 1991; Marshall et al., 2001; Oquendo et al., 2005; Sareen et al., 2007). Results unique to the present study suggest that this risk is present even among PTSD-diagnosed persons who are not dually diagnosed with either MDD or AUD, an important finding given extant empirical evidence of relations between these two diagnoses and risk of suicide. Moreover, consistent with prior studies (Ferrada-Noli et al., 1998; Jakupcak et al., 2009; Shalev et al., 1998; Tarrier & Gregg, 2004), dually-diagnosed participants were not significantly more likely to endorse suicidality than participants carrying only a PTSD diagnosis. For clinicians treating patients with PTSD, these results argue for the importance of regularly assessing for suicidality, irrespective of the presence or absence of other psychiatric problems. Although clinicians are likely accustomed to monitoring self-harm risk in patients diagnosed with MDD, given the explicit inclusion of suicide-related cognition and behaviors among the criteria for this diagnosis, clinicians may be disinclined to repeatedly assess self-harm risk when working with patients who have presented with a primary anxiety-spectrum disorder.

Among PTSD-diagnosed participants, bivariate relations between suicidality and scores indexing the severity of distinct clusters of PTSD and MDD symptoms were all of modest to moderate strength, with shared variance ranging from 5% - 14%. With respect to PTSD symptom clusters specifically, it is interesting to note that the bivariate association of greatest magnitude was between numbing symptoms (e.g., feelings of detachment from others; restricted range of affect) and suicidality, whereas the bivariate association of weakest magnitude was that between avoidance symptoms (e.g., efforts to avoid thoughts, feelings, or conversations associated with the trauma) and suicidality. Conventionally, and consistent with DSM-IV nomenclature, numbing and avoidance symptoms are grouped together. The present results suggest that there is clinical utility in distinguishing between avoidance and numbing phenomena when examining data at the level of symptom clusters, an approach that would be in line with available psychometric data (Asmundson et al., 2000; King, Leskin, King, & Weathers, 1998; McDonald et al., 2008).

When PTSD and MDD symptom clusters were considered jointly in the prediction of suicidality among PTSD-diagnosed participants, scores on the numbing cluster of PTSD symptoms and the cognitive-affective cluster of depressive symptoms (e.g., persistent depressed mood; excessive/inappropriate guilt) were positively, uniquely related to

suicidality. Relevant data in the existing literature are scarce, and where available, those data are inconsistent and not directly comparable. For example, at least two studies (Hendin & Haas, 1991; Tarrier & Gregg, 2004) found no unique effects on suicidality associated with specific PTSD symptom clusters, while another study (Bell & Nye, 2007) found a unique effect associated only with re-experiencing symptoms; none of these studies, however, distinguished between symptoms of avoidance and symptoms of numbing. As noted above, this distinction may be of considerable import when examining the relation between PTSD symptomatology and suicidality.

In the present research, suicidality was operationalized by threshold scores on a measure that tapped participants' suicidal ideation, suicidal intent, and plans for suicide. Results, then, do not speak directly to the relation between clinical risk factors of interest (e.g., PTSD) and actual suicide attempts. Participants' history of suicide attempts was queried as part of this research, but data did not allow for examination of risk factors contemporaneous with the reported suicide attempt(s). Although this is a limitation of the current study, it is a limitation common to much of the pertinent research that has previously been conducted (Bell & Nye, 2007; Jakupcak et al., 2009; Marshall et al., 2001; Sareen et al., 2007). Note also that the prediction of suicide ideation is clinically meaningful; available data indicate that suicide ideation is the best predictor of risk for a suicide attempt (Brown et al., 2000; Mann et al., 2008). Still, future studies might redress this limitation by following participants prospectively. This is, in fact, an approach the current investigators plan to adopt within the scope of a broader research program examining post-deployment mental health, a program that is initiating a longitudinal component.

Finally, as the current sample was comprised entirely of OEF/OIF veterans, the findings presented above are not necessarily generalizable to civilian or other military populations. Although our reading of the literature does not lead us to expect that relations among constructs central to the current study will vary by civilian/military status, greater support for this position can only be obtained through future research with pertinent samples. Even if these relations are determined to be population-specific, however, the import of the current findings remains significant, given the relatively high prevalence of PTSD among veterans who were deployed to combat zones.

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Research Highlights

- PTSD associated with suicidality, even absent psychiatric comorbidity
- Dually diagnosed S's not more likely to endorse suicidality than S's with PTSD only
- PTSD/MDD symptom clusters differentially related to suicidality among S's with PTSD

Table 1
Summary Statistics

	All Participants (N=393)			
	N	%	M	SD
Age			38.3	10.25
Gender				
Male	322	81.9		
Female	71	18.1		
Race/Ethnicity				
Caucasian	186	47.5		
African-American	175	44.6		
Hispanic	14	3.6		
Native American	11	2.8		
Other	7	1.5		
Marital Status				
Never Married	102	26.0		
Married	225	57.3		
Divorced/Separated	65	16.5		
Widowed	1	0.2		
Posttraumatic Stress Disorder (PTSD)	143	36.4		
Major Depressive Disorder (MDD)	88	22.4		
Alcohol Use Disorder (AUD)	17	3.6		
Comorbid PTSD/MDD	66	16.8		
Comorbid PTSD/AUD	11	2.8		
Suicidality (3 on BSS/SSI-A)	45	11.5		
Previous Suicide Attempt	34	8.7		
Beck Depression Inventory – 2 nd Edition (BDI-II)			15.35	12.31
Davidson Trauma Scale (DTS)			48.49	40.54
Combat Exposure Scale (CES)			14.56	10.15

Note. N = 392 for DTS.

Table 2
Logistic Regression Models Predicting Suicidality from Psychiatric Diagnoses

Predictor	Adjusted Odds Ratio	95% CI	Wald $\chi^2(1)$	P-value
A. PTSD/MDD Model				
Diagnostic Status				
PTSD (+)/MDD (-)	5.6	2.1 – 15.0	11.84	.0006
PTSD (-)/MDD (+)	5.7	1.5 – 21.8	6.33	.0119
PTSD (+)/MDD (+)	8.9	3.4 – 23.4	19.60	< .0001
PTSD (-)/MDD (-)	---	---	---	---
Suicide Attempt History	3.6	1.6 – 8.5	8.82	.0030
CES Score	1.3	0.9 – 1.9	2.33	.1268
B. PTSD/AUD Model				
Diagnostic Status				
PTSD (+)/AUD (-)	5.1	2.3 – 11.4	16.31	< .0001
PTSD (-)/AUD (+)	2.3	0.3 – 20.2	0.60	.4396
PTSD (+)/AUD (+)	6.1	1.3 – 28.2	5.28	.0216
PTSD (-)/AUD (-)	---	---	---	---
Suicide Attempt History	4.2	1.8 – 9.8	10.80	.0010
CES Score	1.3	0.9 – 1.9	2.34	.1259

Note. *N* = 393 in both models.

Table 3
Zero-Order Correlations among PTSD-Diagnosed Participants

Measure/Variable	BDI-II			DTS			
	Total	CA	SV	Total	Re-Exp	Avoid	Numb
Suicidality (BSS/SSI-A 3)	.40	.38	.34	.36	.34	.23	.38
BDI-II Total Score	—	.92	.92	.65	.52	.45	.63
BDI-II Cognitive-Affective (CA)	—	—	.70	.49	.37	.33	.50
BDI-II Somatic-Vegetative (SV)	—	—	—	.71	.58	.50	.66
DTS Total Score	—	—	—	—	.89	.79	.87
DTS Re-Experiencing	—	—	—	—	—	.72	.65
DTS Avoidance	—	—	—	—	—	—	.59
DTS Numbing	—	—	—	—	—	—	.70
DTS Hyperarousal (HA)	—	—	—	—	—	—	—

Note. N = 142 for reported correlations (1 PTSD-diagnosed participant did not complete the DTS).

Note. Suicidality is a dichotomous variable; scores on other indices are continuous. Point-biserial correlation is reported where bivariate association includes suicidality; otherwise, Pearson correlation coefficient is reported.

p < .01 for all reported correlations.

Table 4
Logistic Regression Models Predicting Suicidality among PTSD-Diagnosed Participants

Predictor	Adjusted Odds Ratio	95% CI	Wald $\chi^2(1)$	P-value
A. Total Symptom Severity				
DTS Total Score	2.7	1.0 – 6.9	4.09	.0432
BDI-II Total Score	2.4	1.3 – 4.6	7.12	.0076
Suicide Attempt History	2.1	0.7 – 6.3	1.76	.1840
B. Symptom Clusters				
DTS Re-Experiencing	2.3	0.8 – 6.5	2.48	.1154
DTS Avoidance	0.5	0.2 – 1.4	1.60	.2062
DTS Numbing	3.8	1.2 – 11.9	5.09	.0241
DTS Hyperarousal	0.7	0.2 – 2.4	0.41	.5231
BDI-II Cognitive-Affective	2.0	1.1 – 3.8	4.76	.0291
BDI-II Somatic-Vegetative	1.0	0.4 – 2.5	0.00	.9986
Suicide Attempt History	2.2	0.7 – 7.0	1.77	.1835

Note. $N = 142$ (1 PTSD-diagnosed participant did not complete the DTS)