Research paper

Posttraumatic stress disorder and suicidal ideation, plans, and impulses: The mediating role of anxiety sensitivity cognitive concerns among veterans

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Abstract

Although the relationship between posttraumatic stress disorder (PTSD) and suicide has been firmly established, research on underlying mechanisms has been disproportionately low. The cognitive concerns subscale of anxiety sensitivity (AS), which reflects fears of cognitive dyscontrol, has been linked to both PTSD and suicide and thus may serve as an explanatory mechanism between these constructs.

Methods: The sample consisted of 60 male veterans presenting to an outpatient Veteran Affairs (VA) clinic for psychological services. Upon intake, veterans completed a diagnostic interview and brief battery of self-report questionnaires to assist with differential diagnosis and treatment planning.

Results: Results revealed a significant association between PTSD symptom severity and higher suicidality (i.e., ideation, plans, and impulses), even after accounting for relevant demographic and psychological constructs. Moreover, AS cognitive concerns mediated this association.

Limitations: Limitations include the small sample size and cross-sectional nature of the current study.

Conclusions: These findings add considerably to a growing body of literature examining underlying mechanisms that may help to explain the robust associations between PTSD and suicide. Considering the malleable nature of AS cognitive concerns, research is needed to determine the extent to which reductions in this cognitive risk factor are associated with reductions in suicide among at risk samples, such as those included in the present investigation.

1. Introduction

Age-adjusted suicide rates in the United States have increased in recent years (Curtin et al., 2016). As such, suicide is the 10th leading cause of death in the United States (Centers for Disease Control and Prevention, 2010). Previous research has found that death by suicide is strongly predicted by suicidal ideation and attempt history (Kessler et al., 1999). Additionally, emerging evidence supports the role of anxiety in the development of suicidal ideation and attempts. For example, using data collected from the National Comorbidity Survey, Sareen et al. (2005a) found that approximately 70% of individuals with a lifetime history of suicide attempts met criteria for at least one anxiety disorder. Anxiety remains predictive of suicide even after accounting for relevant psychological constructs including depression, substance abuse, and all Axis II diagnoses, further highlighting its value in predicting risk (Cougle et al., 2009; Nepon et al., 2010).

A recent meta-analysis conducted by Bentley et al. (2016) found that the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) anxiety diagnosis that most strongly predicts suicidal ideation and suicide attempt history is posttraumatic stress disorder (PTSD). PTSD is characterized by a constellation of symptoms that develop following exposure to one or more traumatic stressors (American Psychiatric Association, 2013). According to the National Center for PTSD, seven to eight percent of the US population will...
develop PTSD at some point in their lifetime. These rates increase exponentially among individuals who, by virtue of their profession, have increased risk of traumatic exposure (Kessler et al., 2005). Thus, it is not surprising that rates of PTSD are higher in military populations (with and without combat exposure) than in the general population (Hoge and Castro, 2012).

A growing body of research indicates that individuals diagnosed with PTSD are more likely to contemplate or attempt suicide compared to those without PTSD (Sareen et al., 2005b, 2007). This association appears to be related to the symptoms of PTSD rather than the experience of trauma. For example, using a trauma exposed sample Pietrzak et al. (2011) found that individuals with PTSD, compared to those without, were two to five times more likely to attempt suicide. Despite these established relations, research on mechanisms underlying the associations between PTSD and suicide is disproportionately low.

One potential mechanism that may help explain this association is Anxiety Sensitivity (AS). AS, defined as an exaggerated fear of anxiety-related sensations (Reiss et al., 1986), is elevated in both PTSD (Taylor et al., 1992) and suicidal individuals (Capron et al., 2012b). AS is composed of three lower-order subfactors related to the fears of physical, cognitive, and social consequences of anxiety (Zinbarg et al., 1997). Interest in these subfactors has rapidly increased since the publication of the Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). Specifically, the ASI-3 allows researchers to more reliably measure AS subfactors than previous iterations of the Anxiety Sensitivity Index. Consequently, researchers have found that the AS subfactors are differentially related to various forms of psychopathology (Olthuis et al., 2014). For example, AS physical and social concerns are most strongly associated with fear based disorders including panic disorder and social anxiety disorder, whereas AS cognitive concerns are most strongly associated with distress based disorders including generalized anxiety disorder and mood/trauma related disorders (Olthuis et al., 2014).

Several studies have reported on the relations between AS cognitive concerns and PTSD. For example, Vujanovic et al. (2008) found that AS cognitive concerns were significantly associated with Posttraumatic Diagnostic Scale total and avoidance symptoms subscale scores (above and beyond negative affect) in a large sample (N = 239) of trauma exposed adults. Additionally, Asmundson and Stapleton (2007) found police officers with “probable PTSD” (n = 44) scored significantly higher on the AS cognitive concerns subscale than those without PTSD (n = 94). Raines et al. (2016) recently extended this research by examining the relations between AS subfactors and DSM, 5th Edition (DSM-5; American Psychiatric Association, 2013) PTSD symptom clusters using a small sample of veterans (N = 50) presenting to the Veteran’s Healthcare Administration (VA) for treatment. Results revealed associations between AS cognitive concerns and all four DSM-5 PTSD symptom clusters.

A parallel line of research has also found associations between AS cognitive concerns and suicide risk. For example, Schmidt et al. (2001) found that the cognitive dimension of AS was significantly associated with suicidal ideation in a group of patients with panic disorder. Similarly, recent research has demonstrated elevated rates of suicidal ideation and suicide attempt history in a number of clinical and community based populations (Capron et al., 2012a, 2012b, 2012c; Oglesby et al., 2015). Given the extant literature demonstrating a relationship between AS cognitive concerns and both PTSD and suicide, it stands to reason that this cognitive risk factor may be one mechanism accounting for the relationship between PTSD and suicide.

The purpose of the proposed study was to examine the relationship between PTSD and suicide, and the potential mediating role of AS cognitive concerns, using an outpatient sample of veterans presenting to a PTSD clinic. Consistent with prior research (Bentley et al., 2016), it was hypothesized that higher PTSD symptom severity would be associated with higher suicidal ideation and risk, even after accounting for relevant demographic (i.e., Caucasian status; Conwell et al., 2002) and psychological constructs (i.e., alcohol and substance use; Borges et al., 2000) as well as depression and anxiety diagnoses. Further, it was hypothesized that this relationship would be indirect through AS cognitive concerns, rather than AS physical or social concerns.

2. Methods

2.1. Participants and procedure

The sample included 60 male veterans, with ages ranging from 23 to 68 (M = 45.20, SD = 12.47), presenting for an intake assessment to an outpatient PTSD and substance use clinic at a large, Southeastern VA clinic. Prior to receiving psychological services, all veterans were assessed for PTSD and substance use and completed a brief battery of self-report questionnaires to assist with diagnostic clarification and treatment planning. Regarding primary diagnosis, 45.0% of the sample met diagnostic criteria for PTSD, 8.4% for an Other Trauma-and-Stressor Related Disorder, 18.4% for a Depressive Disorder, 13.3% for a Substance-Related and Addictive Disorder, and 8.3% for an Anxiety Disorder, with 6.6% missing data. Additionally, 13.3% of the sample concurrently met for a trauma- and stressor-related disorder and a depressive disorder diagnosis regardless of which diagnosis was primary. The racial composition of the sample was as follows: 65.0% African American and 35.0% Caucasian. Regarding highest level of education obtained, 3.3% completed less than high school, 30.0% completed high school or the equivalent, 56.7% completed some college, 5.0% completed college, 3.3% completed some graduate school, and 1.7% completed a postgraduate degree.

The majority of veterans served in the Army (50.0%), followed by the Navy (15.0%), Marine Corps (11.7%), National Guard (8.3%), Air Force (3.3%), Coast Guard (1.7%), or served in more than one branch (10%). War zone service included Vietnam (11.7%), Operations Desert Storm (ODS; 13.3%), Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF; 41.7%), Other peacekeeping deployments (5.0%), multiple deployments (11.7%) and no deployments (16.6%). Trauma type was as follows: 63.3% combat, 10.0% witnessing another person killed or badly hurt, 10.0% other (e.g., military training related accidents), 3.3% were victims of a serious crime, 1.7% involved in a serious car accident, 1.7% were physically or sexually abused as an adult, and 1.7% were physically or sexually abused as a child, with 8.3% missing data.

3. Measures

3.1. Alcohol use disorders identification test (AUDIT)

The AUDIT is a 10-item self-report questionnaire designed by the World Health Organization to classify individuals with alcohol-related problems (Saunders et al., 1993). Prior research has demonstrated strong psychometric properties for this measure (Babor et al., 2001). Additionally, in the current study the AUDIT displayed great internal consistency (Cronbach's alpha = .93).

3.2. Anxiety sensitivity index-3 (ASI-3)

The ASI-3 is an 18-item self-report questionnaire used to measure fear of and concern about the negative effects of anxious arousal (Taylor et al., 2007). It is composed of three empirically supported subfactors: fear of physical arousal (e.g., "It scares me when my heart beats rapidly"), fear of publicly observable symptoms of anxiety (e.g., "It is important to me not to appear nervous"), and fear of cognitive dyscontrol (e.g., "It scares me when I am unable to keep my mind on a task"). Participants indicate the degree to which they agreed with each item on a five-point Likert scale ranging from zero (Very little) to four (Very much) with higher scores reflecting greater levels of anxiety sensitivity. The ASI-3 has demonstrated sound psychometric properties.
in previous research (Taylor et al., 2007). Similarly, in the current study internal consistency was good to excellent for all three subfactors (Cronbach’s alpha = .87 – .91).

3.3. Depression symptom inventory-suicide subscale (DSI-SS)

The DSI-SS is a 4-item self-report questionnaire assessing suicidal ideation (e.g., “Most of the time I have thoughts of killing myself”), suicidal plans (e.g., “I am having thoughts about suicide and am considering possible ways of doing it”), control of suicidal thoughts (e.g., “I am having thoughts about suicide but have these thoughts somewhat under my control”), and suicidal impulses (e.g., “In most situations I have impulses to kill myself”; Metalsky and Joiner, 1997) in the past two weeks. Prior research has found strong psychometric properties for the DSI-SS (Joiner et al., 2002). Internal consistency in the present investigation was good (Cronbach’s alpha = .87).

3.4. Drug use disorders identification test (DUDIT)

The DUDIT is an 11-item self-report questionnaire intended for use with the AUDIT as a way to classify individuals with drug-related problems (Berman et al., 2003). The DUDIT has been found to have sound psychometric properties (Voluse et al., 2012). In the current investigation, the DUDIT displayed excellent internal consistency (Cronbach’s alpha = .96).

3.5. Posttraumatic stress disorder checklist-5 (PCL-5)

The PCL-5 is a 20-item self-report questionnaire designed to assess for DSM-5 PTSD symptoms in the past month (Blevins et al., 2015). Previous research has found the PCL-5 to be a psychometrically sound and valid measure of PTSD symptoms (Bovin et al., 2015). Similarly, in the current study internal consistency was excellent (Cronbach’s alpha = .94).

4. Results

4.1. Preliminary analyses

First, we examined means, standard deviations, and zero-order correlations for all variables of interest (see Table 1). The mean AUDIT total score was considerably higher than that found in other military populations (Erbes et al., 2007; McDevitt et al., 2010). Likewise, the mean DUDIT total score was well above the recommended cut-score used to distinguish those with drug related problems (Berman et al., 2003). The mean PCL-5 total score was substantially higher than the recommended cut-score and higher than that found in other studies of veteran samples (Bovin et al., 2015). Regarding suicide and ASI-3 cognitive concerns, the sample means were well above those found in a community-based treatment seeking sample (Schmidt et al., 2014). Finally, in terms of bivariate correlations, there was a significant positive association between PTSD and suicidal ideation, plans, and impulses. Further, there were significant positive associations between AS cognitive concerns and social concerns and PTSD, as well as AS cognitive concerns and social concerns and suicidal ideation, plans, and impulses.

4.1.1. Primary analyses

First, a regression model was examined estimating the relationship between PTSD symptoms and suicidal ideation, plans, and impulses, after controlling for relevant demographic (i.e., Caucasian status) and psychological constructs, including alcohol and substance use (as measured by the AUDIT and DUDIT) as well as depression and anxiety diagnoses. Preliminary analyses revealed that there were no violations of the assumptions of normality, multicollinearity, or homoscedasticity for the independent variables. However, given the nature of DSI-SS scores (count data with many zeroes), negative binomial regression was used in all models. Results revealed that, after controlling for race, depression and anxiety diagnoses, and AUDIT and DUDIT scores, higher PTSD symptoms were significantly associated with higher rates of suicidal ideation, plans, and impulses (B = .03, SE = .02, p = .045).

Next, to test our hypothesis that the association between PTSD symptom severity and higher suicidal ideation, plans, and impulses, would be indirectly associated, through AS cognitive concerns, asymmetric bootstrapping mediation procedures, as outlined by Preacher and Hayes (2004), were used. All control variables were included as well. PTSD symptoms were significantly associated with AS cognitive concerns (B = .28, SE = .05, p < .001) and AS cognitive concerns were significantly associated with suicidal ideation, plans, and impulses (B = .08, SE = .05, p = .04). PTSD symptoms were no longer associated with suicidal ideation, plans, and impulses (B = .01, SE = .02, p = .73). The indirect effect between PTSD symptoms and suicidal ideation, plans, and impulses through AS cognitive concerns was significant (B = .02, 95% CI [.004, .06]).

Finally, to demonstrate specificity regarding the role of AS cognitive concerns, a multiple indirect effects model approach was used to test the hypothesis that AS cognitive concerns rather than AS physical or AS social concerns would explain the relationship between PTSD symptom severity and higher suicidal ideation, plans, and impulses. This model also included all control variables (see Fig. 1). Consistent with initial prediction, results revealed that there was an indirect effect of PTSD on suicidal ideation, plans, and impulses through AS cognitive concerns (B

Table 1

Means, standard deviations, and zero-order correlations for all variables used in the current analyses.

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Note.

* = p < .05.
** = p < .01.
*** = p < .001.
5. Discussion

Consistent with expectation, results revealed a significant association between PTSD symptom severity and higher suicidal ideation, plans, and impulses, even after controlling for a number of relevant demographic and psychological constructs. These findings are consistent with prior research demonstrating an increased risk of suicidality among those with PTSD (Bolton and Robinson, 2010; Nock et al., 2010). Moreover, these findings support a large body of literature illuminating the associations between PTSD and suicidal symptoms among trauma exposed veteran samples (Fontana and Rosenheck, 1995; Jakupcak et al., 2009).

In line with initial prediction, results also revealed that the association between PTSD symptom severity and higher suicidal ideation, plans, and impulses was indirect through AS cognitive concerns, rather than AS physical or AS social concerns. Prior research has demonstrated associations between this cognitive risk factor and PTSD (Raines et al., 2016; Vujanovic et al., 2008) as well as suicidal ideation (Capron et al., 2012b; Oglesby et al., 2015). The current findings support and extend the limited empirical work available establishing a link between these variables by elucidating one mechanism that partially accounts for the associations noted. To further improve our understanding of these relations, future investigations should examine other constructs that may add explanatory value to the model.

Results also revealed significant zero-order correlations between AS social concerns and PTSD symptom severity, as well as AS social concerns and suicidal ideation, plans, and preparations. While somewhat unexpected, prior meta-analytic research has found significant, albeit weak, correlations between AS social concerns and PTSD (Naragon-Gainey, 2010). Further, prior research has found significant associations between AS social concerns and suicidal symptoms (e.g., ideation, plans, and impulses; Capron et al., 2012b). The social concerns component of AS represents fears of the publically observable symptoms of anxiety (Taylor et al., 2007). Individuals elevating this AS subdomain are more likely to fear symptoms of anxiety including sweating, blushing, and trembling, due to the belief that they will result in embarrassment and/or negative evaluation. This fear, in turn, may lead one to withdrawal or isolate from social settings thereby increasing levels of thwarted belongingness, a preeminent risk factor for suicide (Van Orden et al., 2010).

Broadly, the current findings are also consistent with existing cognitive theories of PTSD which posit that negatively based appraisals (e.g., "I am going mad/crazy") of the trauma and/or its sequelae (e.g., recollections, flashbacks, concentration difficulties) may be one factor contributing to the causation and maintenance of PTSD (Ehlers and Clark, 2000). Specifically, trauma theories propose that the traumatic event causes a change in the individuals’ cognitions and beliefs, which in turn play an integral role in their emotional and behavioral response to the trauma. For example, individuals who believe that intrusion related symptoms are an indication that they have permanently changed for the worse may be more inclined to engage in dysfunctional coping strategies including thought suppression. When attempts at suppression prove unsuccessful, one may conclude that they have lost control over their cognitive capacities (i.e., increased AS cognitive concerns) subsequently leading to more negative appraisals of naturally occurring PTSD symptoms. Suicidal ideation and attempts may then emerge as a way to escape this escalating feedback loop of distress (Katz et al., 2011).

Encouragingly, prior research suggests that AS, in particular the cognitive concerns component is capable of being rapidly reduced (Schmidt et al., 2017; Schmidt et al., 2007). For example, Schmidt et al. (2014) found that individuals randomized to a brief one-session Cognitive Anxiety Sensitivity Treatment, compared to a health information control, evidenced reductions in AS cognitive concerns both immediately and over time. The reductions in AS cognitive concerns were also associated with decreases in PTSD and suicidal symptoms. In light of the high rates of PTSD and suicide among military veterans (Jakupcak et al., 2009), these findings are promising. That is, interventions focused on this malleable, cognitive risk factor may help to reduce risk among veteran samples. As such, future research should examine the utility of such protocols within health care settings such as the VA.

The current investigation has several limitations worth noting. First, all constructs of interest were measured simultaneously precluding inferences regarding causality. Although prior research has established AS as a maintenance factor for various forms of psychopathology (Olatunji and Wolitzky-Taylor, 2009), one cannot conclusively rule out the alternative (Rogers et al., 2016) or that even a bidirectional relationship exits (Marshall et al., 2010). Future research is needed to more clearly elucidate the temporal relations between these variables, particularly given that mediation requires temporal precedence. Second, the sample was comprised solely of male veterans. Although men comprise 85% of our armed forces, the number of female military personnel has increased in recent years. Moreover, research has repeatedly shown that women have higher levels of AS (Deacon et al., 2003; Norr et al., 2015), which may help to explain the increased rate of attempts among females. As such, future research should seek to replicate these findings using more diverse samples. Third, all constructs of interest were measured using self-report. Despite reliance upon well-validated and psychometrically sound assessment instruments (Metalsky and Joiner, 1997; Taylor et al., 2007; Weathers et al., 2013), future research would benefit from multi-method approaches including behavioral assessments. Fourth, it is possible that the associations between AS cognitive concerns, PTSD, and suicidal ideation, plans, and impulses, may not generalize to actual death by suicide. However, suicidal ideation, plans, and impulses are among the strongest and most reliable predictors of death by suicide (Kessler et al., 1999) and have been used in previous research examining suicidality (Raines et al., 2014; Sareen et al., 2007; Schmidt et al., 2001). Finally, we were only able to control for depression and anxiety, important potential confounding variables, at the diagnostic level. Whereas including the presence of anxiety and depression diagnoses did not
impact our findings, the impact of symptom severity on our findings remains to be seen.

Despite these limitations, the current investigation provides important information regarding mechanisms that help to explain the robust relations between PTSD and suicide. Indeed, suicide rates among military personnel have surged in recent years. Although, there has been some research aimed at identifying underlying risk factors that may help to explain these associations (LeardMann et al., 2013), this research has largely uncovered what Kraemer et al. (1997) would consider as “fixed markers,” that is, factors that are unable to be altered such as history of abuse, male gender, and older age. While these markers are important for identifying vulnerable individuals, they provided no assistance in the prevention of suicide. On the other hand, variable risk factors, such as the one identified in the present investigation, could serve as a viable target for prevention interventions. As such, future research is needed to determine the malleability of this cognitive risk factor within veteran samples and to determine if reductions are in turn associated with reduced risk.

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Capron, D.W., Blumenthal, H., Medley, A.N., Lewis, S., Feldner, M.T., Zvolensky, M.J., Marshall, G.N., Miles, J.N.V., Stewart, S.H., 2010. Anxiety sensitivity and PTSD symptom severity are in turn associated with reduced risk. As such, future research is needed to determine the malleability of this cognitive risk factor within veteran samples and to determine if reductions are in turn associated with reduced risk.


Centers for Disease Control and Prevention, 2010. Tenth Leading Cause of Death for Americans.


