An examination of PTSD symptoms and their effects on suicidal ideation and behavior in non-treatment seeking veterans☆

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ABSTRACT

This study sought to examine the effect of general PTSD symptoms as well as specific PTSD symptom clusters on suicidal ideation and suicidal attempts. We first compared a correlated factors solution consistent with the DSM-5 symptom clusters for PTSD with a bifactor solution comprising a General PTSD factor and orthogonal specific factors. Using the best fitting model (i.e., bifactor solution), we then investigated the effect of specific PTSD symptom clusters on severity of suicidal ideation and suicide attempts above and beyond the effect of general PTSD symptoms. A sample of 773 veterans who have never sought professional mental health treatment were screened for suicidal ideation within the past two weeks. One month after the baseline measurement, the participants completed a follow-up assessment, again by telephone. A bi-factor solution was used to account for a general PTSD factor as well as the specific DSM-5 PTSD symptom clusters. After controlling for baseline suicidal ideation and behavior, it appeared that the Anxious Arousal factor was predictive of changes in the magnitude of severity of suicidal ideation and the General PTSD factor was predictive of the onset of new suicidal behavior at the one-month follow-up. Additionally, the Re-experiencing factor of PTSD also significantly predicted new suicidal behavior at the one-month follow-up. These results suggest that it may beneficial for clinicians, who are assessing individuals with PTSD for suicidality, to be aware of the frequency, duration, and content of their clients' repetitive, intrusive thoughts as these thoughts may increase their capability to inflict non-lethal or lethal forms of self-injury.

1. Introduction

Out of the veterans who die by suicide in the United States each year, only approximately 1/3 were recorded as users of veteran's health administration services before their death (U.S. Department of Veterans Affairs, 2017). The largest increase in suicide deaths among veterans are found amongst veterans who have not used Veterans Affair (VA) services. Specifically, the rate of suicide in veterans who did not use VA services increased by 38.6% within the past year while the rate of suicide in their counterparts who are using VA services increased by 8.8% (USDVA, 2017). A national study examining suicide risk in college students also found that only 20% of students who died by suicide had sought professional help (Czyz et al., 2013). Furthermore, Cleary (2017) found that following a medically serious suicide attempt, one third of young men never attended the additional services to which they were referred while approximately half of the young men made a subsequent suicide attempt following discharge. A significant limitation

in suicide research thus far is the dearth of research examining suicide risk specifically in individuals who are not seeking treatment. As such, additional investigation into the population of individuals who are not receiving professional services is needed.

Suicide is often discussed as an outcome associated with a variety of psychiatric disorders including depression (Hawton et al., 2013), anxiety (Thibodeau et al., 2013), and post-traumatic stress disorder (PTSD; Gradus et al., 2010). Indeed, among Iraq and Afghanistan War veterans, suicidal ideation has been found to be four times more likely to occur when veterans screened positive, as opposed to negative, for PTSD (Jakupcak et al., 2009). In a nationally representative sample of the United States, LeBouthillier et al. (2015) found that each additional traumatic experience in an individual's lifetime contributes to a 20.1% increase in the likelihood of suicidal ideation and a 38.9% increase in the probability of making a suicide attempt. Furthermore, past studies have found that the combined (vs. independent) presentation of major depressive disorder and PTSD is associated with greater levels of

suicidal ideation (Cougle et al., 2009). Additionally, individuals who are experiencing PTSD symptoms alone or with major depressive disorder seem to demonstrate a greater frequency of suicide attempts than those who experience major depressive disorder symptoms alone (Cougle et al., 2009). Examining the records for individuals who have died by suicide, Gradus et al. (2010) found that after accounting for other psychiatric and demographic variables, the presence of a PTSD diagnosis increased the odds of dying by suicide by approximately 10%. A meta-analysis examining the association between PTSD and suicide also found PTSD to be associated with prior suicide attempts and suicidal ideation even after controlling for other psychiatric disorders (Krysinska and Lester, 2010).

To determine if specific symptoms of PTSD are unique in their contribution to suicide risk, researchers have also examined the effect of various clusters of PTSD symptoms on suicidal ideation and suicide risk. In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-*5*; American Psychiatric Association, 2013), PTSD is conceptualized as having four symptom clusters. The intrusive, Re-experiencing symptoms involve a persistent re-experiencing of the traumatic event through intrusive thoughts, nightmares, flashbacks, or emotional distress and physical reactivity to reminders of the trauma. Avoidance is described as the avoidance of trauma-related stimuli such as thoughts or feelings and reminders after the trauma. Symptoms of dysphoria reflect negative alterations in cognition and mood following trauma, including the inability to recall prominent features of the trauma, overly negative thoughts and assumptions about the self or the world, exaggerated blaming of the self or others for causing the trauma, increased negative affect, decreased interest in activities, feelings of isolation, and inability to experience positive affect. Finally, Hyperarousal, involve alterations in arousal and reactivity such as insomnia, increased irritability/aggression, risky/destructive behavior, hypervigilance, heightened startle response, and difficulty concentrating following a trauma. The new conceptualization of PTSD symptom clusters in the DSM-5 separates the singular Avoidance and Numbing symptom cluster from the previous edition into independent Avoidance and Dysphoria symptom clusters.

In extant theories of suicide, it has been posited that the desire and thoughts of suicide are different from the capability to overcome the pain and distress associated with inflicting lethal self-injury (Joiner, 2005; Klonsky and May, 2015). Based on the research that has stemmed from these theories, it would be expected that Hyperarousal (Ribeiro et al., 2014) and Re-experiencing symptoms (Law and Tucker, 2017) would contribute to an increased risk for suicidal behaviors while the remaining PTSD symptoms may be more relevant to increased suicidal ideation. Past studies using DSM-IV and DSM-5 symptom clusters for PTSD, however, have found that the Re-experiencing (Barr et al., 2016; Bell and Nye, 2007; Boffa et al., 2017), Hyperarousal (Brier et al., 2015; Pennings et al., 2017), and Numbing (Boffa et al., 2017; Pennings et al., 2017) symptoms are associated with increased suicidal ideation. On the other hand, the Avoidance (Barr et al., 2016; Legarreta et al., 2015; Selaman et al., 2014), Dysphoria (Legarreta et al., 2015), Numbing (Pennings et al., 2017), Hyperarousal (Briere et al., 2015), and Re-experiencing (Boffa et al., 2017; Selaman et al., 2014; Watkins et al., 2017) symptoms have all been linked to suicidal behavior. Overall, suicide risk was found to be higher with elevated levels of arousal and lower levels of avoidance symptoms (Ben-Ya'acov and Amir, 2004). Hospital admissions associated with suicide were also found to be linked to the negative alterations in cognitions and mood symptom cluster (Vujanovic et al., 2017). Unfortunately, the inconsistent findings between these studies have not been able to provide us with a clear picture as to how PTSD symptoms contribute to suicidality.

One plausible explanation for the lack of consistent findings between PTSD symptom clusters and suicidal outcomes is that the variance common across all PTSD symptom clusters may be accounting for the relation between PTSD symptoms and suicidal ideation and behavior. In most prior studies of PTSD symptoms dimensions and suicide,

researchers are tasked with deciding between including all PTSD symptom clusters together and thus only capture variance unique to a symptom cluster and including each PTSD symptom cluster in a separate model and thus conflate shared and unique variance among PTSD symptom clusters. To account for the variance that is common across all PTSD symptom clusters, as well as the variance unique to each cluster simultaneously, bifactor modeling (e.g., Reise, 2012) can be used. Bifactor modeling is a structural equation modeling (SEM) technique in which a single underlying factor is modeled to account for variance among all items (i.e., a general PTSD factor) and orthogonal specific symptom cluster factors are modeled to account for non-shared variance. The use of bi-factor model in PTSD research was suggested in a meta-analysis by Yufik and Simms (2010) who stated that examining a bifactor model would allow for the examination of the relative influence of a general PTSD factor compared to specific factors. Later, Byllesby et al. (2017) examined whether PTSD symptoms were best captured by a correlated factors solution consistent with the DSM-*5* (American Psychiatric Association, 2013) symptom clusters (i.e., Re-experiencing, Avoidance, Dysphoria, Hyperarousal) or by a bifactor solution comprising a General PTSD factor and orthogonal specific factors. The authors found the bifactor solution to be supported and using the bifactor solution, they then examined the relations between the PTSD factors and depression symptoms and found that only the General PTSD factor was significantly related to depression symptoms (Byllesby et al., 2017). In a national epidemiological survey study, it was also found that the use of a bi-factor model outperformed competing CFA models for PTSD (Chen et al., 2017). This epidemiological study also found that the General PTSD factor demonstrated significant and positive associations with suicide attempts. Given these findings, it is possible that general distress caused by PTSD symptoms, and not specific symptom clusters, are predictive of suicidal ideation and behavior. Furthermore, the bi-factor model provides a more accurate determination of whether or not the General PTSD factor alone contributes to suicidality or if there are specific PTSD symptom clusters that contribute to suicidality above and beyond the General PTSD factor. Under this model, if suicidality is, indeed, only associated with the General PTSD factor then it is likely that suicide risk can be addressed by treatments that reduces general distress caused by PTSD symptoms. On the other hand, if a specific PTSD symptom cluster is found to contribute to suicidality above and beyond general distress, then it may be important to prioritize or concurrently provide intervention specific to that symptom cluster.

1.1. The current study

The majority of suicide research has largely focused on predictors of suicidal ideation whereas only a small percentage has investigated suicide attempters. Thus, it is important to differentiate factors that may contribute to suicidal ideation versus suicidal behavior (Klonsky and May, 2014). As such, the aims of the present study were two-fold. The primary aim of this study was to determine whether the General PTSD factor significantly contributes to the magnitude, and related changes, of suicidal ideation and behaviors in a sample of veterans who exhibited recent suicidality but are not engaged in mental health treatment. We seek to expand on the findings by Chen et al. (2017) by using a bi-factor model to examine the association between PTSD symptoms, suicidal ideation, and suicide attempts. Consistent with prior literature, we hypothesize that elevated PTSD symptoms will, indeed, contribute to increased suicidal behaviors (Chen et al., 2017) and suicidal ideation. Additionally, prior research has found that particular PTSD symptom cluster such as Re-experiencing (Barr et al., 2016; Watkins et al., 2017), Avoidance (Barr et al., 2016; Legarreta et al., 2015) and Hyperarousal (Briere et al., 2015) impact suicidal ideation and behaviors independent of the other PTSD symptom clusters. As such, the secondary aim of this study was to examine the effect of specific PTSD symptom clusters on the magnitude,

and related changes, of suicidal ideation and suicidal behaviors above and beyond the General PTSD factor.

2. Methods

2.1. Participants

Printed flyers and social media posts were used to recruit the participants for a telephone-administered study designed to examine the decision to seek mental health treatment (W81XWH-13-2-0032; Increasing Treatment Seeking among At-Risk Service Members Returning from Warzones, funded by Department of Defense) in order to improve mental health for current and past military personnel who do not seek treatment.

The inclusion criteria for the participants were: being a service member of the United States Armed Forces after September 11, 2001, not being in mental health treatment during the study, and endorsing a recent suicidal ideation (reporting a response of 1 or higher on the Patient Healthcare Questinnaire-9 [PHQ-9] item 9, indicating thoughts of being better off dead or hurting oneself for several days or more) or a lifetime suicide attempt (43.9% endorsed a prior suicide attempt).

Current and past military service members (*N* = 773) completed the baseline interview (*M* age = 31.3 years, *SD* = 6.8; 89.3% male, 30.1% married). An additional 1122 participants were excluded from the sample because they did not meet the inclusion criteria: 66.4% (745) did not endorse suicide ideation, 17.6% (197) receiving mental health treatment, 8.5% (95) not interested, 6.6% (74) had been members of military forces before September 11, 2001, and 0.8% (9) never served in the military.

The participants identified themselves as White (74.5%), Black (12.1%), Asian/Pacific Islander (3.0%), Native American (1.8%), and other or mixed race (7.6%). Furthermore, 8.7% self-identified as Hispanic. Participants indicated their service branch as follows: Army (69.3%), Marines (16.3%), Navy (9.7%), and Air Force (8.1%). In the last 90 days, 33.2% of the participants were unemployed, 32.9% were employed full-time, 13.1% were full or part-time students, 10.6% were employed part-time, 9.8% were retired or on disability, and 0.4% failed to report employment status. Participants were predominantly no longer serving in the Armed Forces (95.9%) and were Operation Enduring Freedom/Iraqi Freedom (OEF/OIF) veterans (96.5%). Approximately 42% reported being childless.

2.2. Measures

2.2.1. Patient health questionnaire-9 (PHQ-9)

The PHQ-9 is a 9-item self-administered screening tool of DSM-IV (DSM-IV; American Psychiatric Association, 1994) symptoms of depression (Spitzer et al., 1994). The PHQ-9 has excellent measurement properties, and has proven to be effective for assessment of major depression and subthreshold symptoms of depression (Martin et al., 2006). The questionnaire asks the participants to rate their depressive symptoms during the previous two weeks on a 4-point Likert scale from 0 (*Not at all*) to 3 (*Nearly every day*). A participant who reported a response of 1 or higher on an item were counted as endorsing the symptom. In this study, the reliability of the PHQ-9 was adequate (omega [ω] = 0.71).

2.2.2. PTSD checklist for DSM-IV – military version (PCL-M)

PTSD symptoms were assessed at baseline using the PCL-M (Weathers et al., 1993), a 17-item self-report instrument measuring the degree to which military participants have been bothered by DSM-IV symptoms of PTSD within the last month on a five-point Likert scale, from 0 (*Not at all*) to (4 = *Extremely*). The PCL-M was originally developed and validated as an instrument to measure the presence of PTSD symptoms needed to make a PTSD diagnosis as defined by the DSM-IV. Past studies, however, have found that the substantial overlap

in DSM-IV and DSM-5 PTSD diagnostic criteria allows the PCL-M to be used as an instrument to approximate the presence of DSM-5 PTSD symptoms and diagnosis (Giumarra et al., 2017; Rosellini et al., 2015). In veteran populations, the PCL-M has demonstrated good psychometric properties (Wilkins et al., 2011). In this study, internal consistency of the PCL-M was good (ω = 0.88).

2.2.3. Columbia-Suicide Severity Rating Scale (C-SSRS)

The C-SSRS, a measure of the severity and frequency of suicidal ideation and behaviors (Posner et al., 2011) which has been validated for administration over the phone (Mundt et al., 2010), was used at baseline and one month later to collect information about current and past suicidal ideation and suicidal behavior. The scores of lifetime and past-week suicidal ideation were assessed on a six-point Likert scale (0 = *None*, 1 = *Death ideation*, 2 = *Nonspecific ideation*, 3 = *Active ideation*, 4 = *Active ideation with intent*, and 5 = *Active ideation with intent and plan*). If a participant endorsed a lifetime actual, interrupted, or aborted suicide attempt suicidal behavior was defined as present at baseline (0 = *absent*, 1 = *present*). Similar criteria were applied at 1-month follow up measurement with suicide ideation assessed during the prior week period and suicidal behavior during the prior month.

2.3. Procedures

The informed consent and baseline screening were obtained from the participants over the phone. For screening, past two-week suicidal ideation was measured using item 9 of the PHQ-9 (Simon et al., 2013). Following screening, as a part of a larger study aimed to test the effectiveness of an intervention to improve treatment seeking, participants were randomly assigned to a control or experimental condition in which they received a brief intervention targeting treatment readiness.[1] Specifically, participants were provided with a single one-on-one phone session for 45–60 min which targeted beliefs that influence whether they enter mental health or substance use treatment using a brief manualized and tailored intervention.

All analyses were conducted including treatment condition as a covariate; however, no significant effects of treatment on suicidal ideation or suicidal behavior were found. Therefore, analyses are reported and discussed excluding treatment. One month after the baseline measurement, the participants completed a follow-up assessment, again by telephone. Participants were payed $50 compensation by mail for the baseline session and $25 by mail for the month one session. Appropriate institutional review boards reviewed and approved all study procedures.

2.4. Data analytic plan

Confirmatory factor analysis (CFA) was performed in Mplus version 8 (Muthén and Muthén, 1998–2012). Because the PCL contained items with five options per item, the data were treated as continuous using the Yuan-Bentler scaled chi-square (Y-B χ^2) estimator to account for missing data. Correlated factors PCL models were compared sequentially, including (1) a one-factor model, (2) the DSM-IV three-factor model, (3) the DSM 5 four-factor model, and (4) the modified DSM 5 five-factor model. Models were compared using the Y-B χ^2 difference test. The DSM 5 model allowed items 1–5 to load on a Re-experiencing factor, items 6–7 to load on the Avoidance factor, items 8–12 on the Dysphoria factor, and items 13–17 on the Hyperarousal factor. The modified version of this further divided the Hyperarousal factor into Hyperarousal (items 13–15) and Anxious Arousal (items 16–17) factors.

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[1] All analyses were conducted including treatment condition and appointment attendance (*n* = 86; 16.3%) as a covariate; however, no significant effects of treatment on suicidal ideation or suicidal behavior were found. Therefore, analyses are reported and discussed excluding treatment.

Once the best-fitting correlated factors model was arrived at, this model was compared to an equivalent bifactor solution. In the bifactor model, factor loadings for factors with only two indicators were set to equality to achieve model identification. Model fit for the best-fitting model was also examined using the Y-B χ^2 value, with a nonsignificant value indicating that the model fit the data well. In addition, several fit indices were used to examine model fit, including the comparative fit index (CFI; values ≥0.95 indicate good fit), the root mean square error of approximation (RMSEA; values ≤0.05 indicate good fit), and the 90% confidence intervals (CIs) around the RMSEA (lower bound values <0.05 indicate good fit cannot be ruled out; upper bound values >0.10 indicate poor fit cannot be ruled out; Hu and Bentler, 1999; Kline, 2011; MacCallum et al., 1996).

If the bifactor model fit the data best, several additional statistical indices were examined to determine the degree of multidimensionality in the PCL factors. Omega hierarchical (ωh) and omega specific (ωs) are measures of reliability for the general and specific factors, respectively (McDonald, 1999; Reise, 2012). Explained common variance (ECV; Bentler, 2009) is an estimate of how much the common factor accounts for the variance explained in the model when error is excluded. Factor determinacy scores (Grice, 2001) provide a measure of confidence in factor scores derived from latent factors. Values of 0.90 or greater are generally considered to show well-measured factors (Gorsuch, 1983).

Once the best-fitting PCL model was determined, the unique relations between the factors in these models and suicidal behavior and ideation, concurrently, and measured one month later controlling for baseline suicidal ideation and behavior, were examined. Baseline suicidal ideation was treated as a continuous outcome. All other suicide outcomes were analyzed using negative binomial regression to account for the skewed distribution of these variables. All suicide outcomes were examined independently to reduce computational demands on these models. To account for multiple comparisons, Benjamini-Hochberg corrections were applied, family-wise to the suicidal behavior and suicidal ideation outcomes.

3. Results

3.1. Descriptive statistics and correlations

Correlations for the PCL items and baseline and month one suicide variables are provided in Table 1. Relations between PCL items and suicide variables are presented using Spearman's coefficient. Potentially problematic nonnormality was reflected by absolute skew values exceeding 2 and absolute kurtosis values exceeding 7 (Curran et al., 1996). No variables exceeded these thresholds. According to the National Center for PTSD suggested PCL-M cut-scores, an estimated cut-score ranging from 45–50 would be indicative of a positive screen for PTSD. PCL scores ≥ 50 were found in 83.8% of the sample and PCL scores ≥ 45 were found in 91.0% of the sample, suggesting high rates of probable PTSD. A recent meta-analysis (Manea et al., 2012) suggested PHQ-9 cut-scores ranging from 8 to 11 were ideal for identifying probable depression. PHQ-9 scores ≥ 11 were found in 93.6% of the sample and PHQ-9 scores ≥ 8 were found in 98.4% of the sample, suggesting high rates of probable depression. At baseline, 66.3% of the sample ($n = 509$) endorsed past suicidal behavior. At month one follow-up, 7.4% of the sample ($n = 39$) endorsed suicidal behavior over the past month. At baseline, mean lifetime suicidal ideation was 3.46 ($SD = 1.48$) and at month one follow-up, mean suicidal ideation was 0.73 ($SD = 1.1$).

3.2. Confirmatory factor analysis of the PCL

Model fit statistics for CFA models of the PCL are provided in Table 2. The best-fitting correlated factors model was the modified DSM 5 five-factor solution comprising Re-experiencing, Avoidance, Dysphoria, Hyperarousal, and Anxious Arousal factors. The bifactor solution of this model fit the data better than the correlated factors solution ($\Delta \chi^2 = 28.59$, $df = 5$, $p < 0.001$). Further, the bifactor solution provided good overall model fit as well (Y-B $\chi^2 = 295.43$, $p < 0.001$, CFI = 0.95, RMSEA = 0.05, 90% CI [0.04, 0.06]). Standardized factor loadings are provided in Fig. 1. All items loaded significant on the general factor (hereafter labeled General PTSD). All items loaded significantly on the orthogonal Re-experiencing, Avoidance, and Anxious Arousal factors and all but item 8 loaded significantly on the Dysphoria factor. Accounting for the general factor, no items loaded significantly on the Hyperarousal factor. The General PTSD factor demonstrated adequate reliability ($\omega h = 0.82$) and accounted for 90.04% of the total variance. For the specific factors, ω was 0.22 for the Re-experiencing factor, 0.25 for the Avoidance factor, 0.40 for the Dysphoria factor, 0.17 for the Hyperarousal factor, and 0.23 for the Anxious Arousal

Table 1
Correlations between PCL items and baseline and month one suicidal behavior and ideation.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. PCL 1	–																			
2. PCL 2	0.65*	–																		
3. PCL 3	0.52*	0.42*	–																	
4. PCL 4	0.56*	0.45*	0.43*	–																
5. PCL 5	0.57*	0.49*	0.44*	0.58*	–															
6. PCL 6	0.36*	0.37*	0.30*	0.40*	0.38*	–														
7. PCL 7	0.42*	0.38*	0.39*	0.46*	0.43*	0.49*	–													
8. PCL 8	0.17*	0.21*	0.17*	0.21*	0.23*	0.24*	0.23*	–												
9. PCL 9	0.29*	0.26*	0.25*	0.30*	0.32*	0.20*	0.27*	0.22*	–											
10. PCL 10	0.19*	0.21*	0.22*	0.28*	0.28*	0.25*	0.26*	0.17*	0.60*	–										
11. PCL 11	0.25*	0.25*	0.23*	0.19*	0.19*	0.17*	0.25*	0.13*	0.45*	0.50*	–									
12. PCL 12	0.21*	0.22*	0.20*	0.23*	0.24*	0.15*	0.16*	0.14*	0.30*	0.33*	0.27*	–								
13. PCL 13	0.37*	0.42*	0.20*	0.28*	0.31*	0.16*	0.26*	0.13*	0.26*	0.22*	0.24*	0.14*	–							
14. PCL 14	0.24*	0.26*	0.25*	0.29*	0.29*	0.25*	0.24*	0.16*	0.33*	0.36*	0.31*	0.25*	0.24*	–						
15. PCL 15	0.26*	0.23*	0.29*	0.28*	0.25*	0.21*	0.29*	0.24*	0.44*	0.35*	0.27*	0.26*	0.27*	0.40*	–					
16. PCL 16	0.38*	0.34*	0.37*	0.40*	0.40*	0.25*	0.30*	0.17*	0.33*	0.31*	0.23*	0.25*	0.28*	0.32*	0.27*	–				
17. PCL 17	0.37*	0.37*	0.36*	0.42*	0.44*	0.26*	0.39*	0.25*	0.30*	0.28*	0.27*	0.27*	0.32*	0.36*	0.39*	0.56*	–			
18. BL SB	0.12*	0.16*	0.11*	0.17*	0.19*	0.10*	0.13*	0.08*	0.10*	0.13*	0.10*	0.13*	0.11*	0.11*	0.07*	0.17*	0.15*	–		
19. BL SI	0.11*	0.11*	0.03	0.07*	0.08*	0.07	0.11*	−0.02	0.17*	0.16*	0.15*	0.23*	0.08*	0.16*	0.13*	0.14*	0.09*	0.08*	–	
20. M1 SB	0.18*	0.15*	0.17*	0.15*	0.19*	0.12*	0.12*	−0.004	0.13*	0.14*	0.09*	0.13*	0.12*	0.08	0.07	0.15*	0.13*	0.24*	–	
21. M1 SI	0.09*	0.06	0.04	0.15*	0.12*	0.12*	0.07	−0.06	0.17*	0.11*	0.08	0.15*	0.11*	0.15*	0.04	0.06	0.09*	0.08	0.34*	0.28*

Note. PCL = Posttraumatic Stress Disorder Checklist. BL = Baseline. SB = Suicidal behavior. SI = Suicidal ideation. Pearson's correlations are reported for all variables other than those involving suicidal behavior and month 1 suicidal ideation.

* $p < 0.05$.

Table 2
Comparison of confirmatory factor analysis models of the DSM-IV PCL.

Models	Y-B χ²	Δ χ²	Δ df	CFI	RMSEA	LL	UL
One-Factor	8980.27***	–	–	0.78	0.09	0.09	0.10
Correlated Factors							
DSM-IV Three-Factor	6320.86***	1620.89***	3	0.85	0.08	0.07	0.08
DSM 5 Four-Factor	3830.24***	2600.80***	3	0.92	0.06	0.05	0.06
DSM 5 Five-Factor	3220.36***	530.25***	4	0.94	0.05	0.04	0.06
DSM 5 Five-Factor[a]	3460.33***	260.13***	2	0.93	0.05	0.05	0.06
Bifactor							
DSM 5 Five-Factor	*2950.43***	*540.79***	*7*	*0.95*	*0.05*	*0.04*	*0.06*

Note. CFI = Comparative fit index. RMSEA = Root mean square error of approximation. LL = Lower limit. UL = Upper limit. All correlated factors models were nested sequentially from the one-factor to the five-factor solution.

[a] Factor loadings for the Avoidance and Anxious Arousal factors were fixed to equality within factors to compare to the bifactor model. Given that the DSM 5 Five-Factor solution fit better than the Five-Factor solution with the factor loadings fixed to equality for the Avoidance and Anxious Arousal factors, this model was compared to and fit worse than the bifactor solution as well (Δ χ² = 280.59, *df* = 5). Best fitting model in italics.

*** *p* < 0.001, ** *p* < 0.01, * *p* < 0.05.

factor. The Re-experiencing factor accounted for 25.95% of the variance in items measuring this factor, the Avoidance factor accounted for 38.06%, the Dysphoria factor accounted for 71.95%, the Hyperarousal factor accounted for 28.45%, and the Anxious Arousal factor accounted for 31.73%. Factor score determinacies were 0.83 for the Re-experiencing factor, 0.62 for the Avoidance factor, 0.82 for the Dysphoria factor, 0.67 for the Hyperarousal factor, 0.62 for the Anxious Arousal factor, and 0.91 for the General PTSD factor.

3.3. Equation modeling examining the relationship between PTSD factors, suicidal ideation, and suicidal behavior

All PTSD factors were included in the model to examine the correlative relationship between PTSD, past suicidal behavior, and current suicidal ideation (see left panel of Table 3). Model fit was available for

the model including baseline suicidal ideation. This model provided marginal to good fit (Y-B χ2 = 330.39, *p* < 0.001, CFI = 0.94, RMSEA = 0.05, 90% CI [0.04, 0.06]). Baseline suicidal ideation was associated with the Dysphoria (β [standardized estimate] = 0.18, *p* < 0.001) and Hyperarousal factors (β = 0.20, *p* = 0.02). Although the General PTSD factor was not significantly associated with baseline suicidal ideation when the Benjamini-Hochberg correction was applied, it was associated with suicidal ideation (β = 0.10, *p* = 0.04) without applying this correction. The General PTSD factor was significantly associated with baseline suicidal behavior (B [unstandardized estimate] = 0.16, *p* < 0.001).

In the right panel of Table 3, the effects of all PTSD factors were examined as predictors of suicidal ideation one month later and new suicidal behavior, controlling for baseline levels of suicidal behavior or suicidal ideation, respectively. For suicidal ideation one month later,
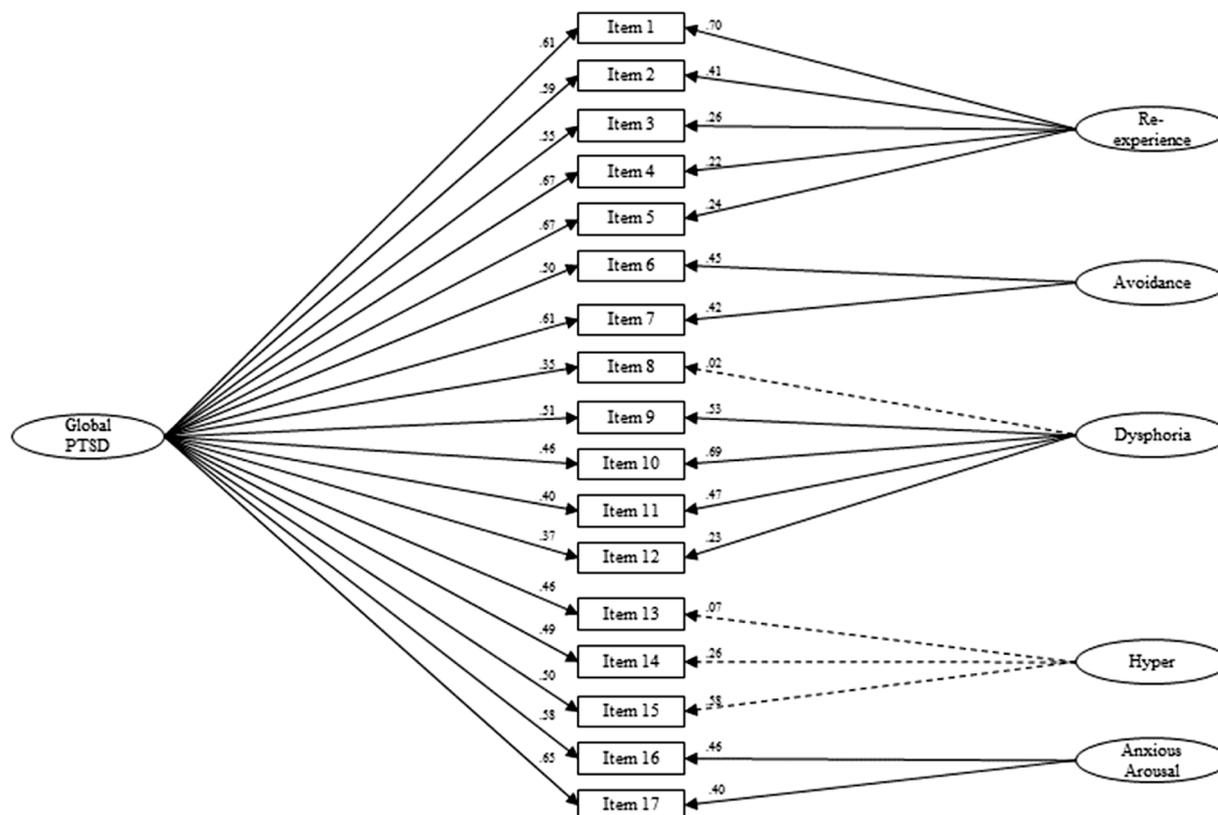

Fig. 1. Bifactor model of PTSD symptoms. PTSD = Posttraumatic Stress Disorder. Hyper = Hyperarousal. Solid lines are indicated for significant factor loadings and dashed lines are indicated for nonsignificant factor loadings.

Table 3
Relations between PTSD factors and suicidal ideation and behavior at baseline and one month later.

Suicidal ideation models	Baseline			Month one		
	β	SE	p	B	SE	p
Re-Experiencing	0.09	0.06	0.14	−0.02	0.15	0.89
Avoidance	0.09	0.07	0.20	0.04	0.13	0.74
Dysphoria	0.18*	0.06	< 0.001	0.04	0.09	0.67
Hyperarousal	0.20*	0.08	< 0.02	−0.14	0.16	0.37
Anxious Arousal	0.11	0.08	0.14	−0.31*	0.12	0.01
General PTSD	0.10	0.05	0.04	0.21	0.10	0.04
Baseline Suicidal Ideation	–	–	–	0.44*	0.08	< 0.001
Suicidal Behavior Models	**B**	**SE**	**p**	**B**	**SE**	**p**
Re-Experiencing	0.02	0.02	0.44	0.45*	0.20	0.02
Avoidance	0.001	0.02	0.97	0.04	0.21	0.84
Dysphoria	0.01	0.02	0.79	0.15	0.21	0.48
Hyperarousal	−0.01	0.02	0.62	−0.18	0.23	0.44
Anxious Arousal	0.04	0.02	0.04	−0.02	0.19	0.90
General PTSD	0.16*	0.03	< 0.001	0.83*	0.20	< 0.001
Baseline Suicidal Behavior	–	–	–	0.98	0.46	0.03

Note. Baseline suicidal ideation was treated as a continuous variable, allowing for reporting of standardized model estimates. All other estimates are unstandardized. SE = Standard error. PTSD = Posttraumatic stress disorder.

   * Significant when Benjamini-Hochberg correction applied.

the Anxious Arousal factor was a significant predictor ($B = -0.31$, $p = 0.01$) as was baseline suicidal ideation ($B = 0.44$, $p < 0.001$). Although the General PTSD factor was not when the Benjamini-Hochberg correction was applied, it was predictive of suicidal ideation at month one ($B = 0.10$, $p = 0.04$) without applying this correction. The General PTSD factor was a significant predictor of suicidal behavior one month later ($B = 0.83$, $p < 0.001$), controlling for baseline suicidal behavior and the other PTSD factors. The Re-experiencing factor was also a significant predictor of suicidal behavior one month later ($B = 0.45$, $p = 0.02$), controlling for baseline suicidal behavior and other PTSD factors. Although baseline suicidal behavior was not significantly predictive of suicidal behavior one month later when the Benjamini-Hochberg correction was applied, it was predictive without applying this correction ($B = 0.98$, $p = 0.03$).

All SEMs were re-examined including PHQ-9 depression scale scores as a covariate, given the high rate of comorbidity between depression and PTSD. In the model predicting baseline suicidal ideation, the Hyperarousal factor was no longer a significant predictor ($β = 0.04$, $p = 0.79$) and the General PTSD factor was not a significant predictor without applying the Benjamini-Hochberg correction ($β = 0.03$, $p = 0.72$). Although depression was not significant when the Benjamini-Hochberg correction was applied, it was without applying this correction ($β = 0.16$, $p = 0.03$). In the model predicting baseline suicidal behavior, there were no substantive differences. The same was found in the model predicting suicidal ideation at month one. Finally, in the model predicting suicidal behavior, the uncorrected significant effect of the Re-Experiencing factor on suicidal behavior one month later was no longer significant ($B = 0.55$, $p = 0.13$). The significant effect of the General PTSD factor was only significant without applying the Benjamini-Hochberg correction ($B = 0.67$, $p = 0.04$) when depression was included in the model.

4. Discussion

Extant research examining the role of PTSD on suicidality in US military service members have yielded incongruent conclusions in regards to the specific PTSD symptom clusters that contribute to suicidal ideation and suicidal behavior. These disparate findings likely emerged from the use of statistical models that did not consider a General PTSD factor. Specifically, past studies examining the relationship between specific PTSD symptom clusters and suicidality often used correlated factor models which do not account for the shared variance between the

symptom clusters. The use of these models suggest that individual PTSD symptom clusters independently contribute to suicidal ideation and behavior and imply that treatment, for individuals exhibiting PTSD symptoms and elevated suicidality, should prioritize and address the specific symptom clusters most strongly with suicidal ideation and behavior. Given the lack of consistency in PTSD symptoms found to impact suicidality, however, it is still unclear as to which PTSD symptom clusters should be prioritized in treatment to decrease suicide risk.

Recently, it has been suggested that the use of a bi-factor model may provide a more accurate representation of PTSD as it allows researchers to compare the relative influence of a General PTSD factor compared to specific symptom clusters (Yufik and Simms, 2010). Indeed, several studies examining the factor structure of the PCL-M have found the bi-factor model to outperform other competing CFA models for PTSD (Byllesby et al., 2017; Chen et al., 2017).

Our examination of the factor structure of the PCL-M in this sample supported a bi-factor solution. Specifically, the models combining the General PTSD factor as well as DSM-5 PTSD symptom clusters outperformed a modified DSM 5 five-factor correlated factors solution on the PCL-M based on DSM-5 Diagnostic Criteria for PTSD. These findings are consistent with Byllesby et al.'s (2017) findings that support a bi-factor solution when examining the effects of PTSD symptoms on psychiatric outcomes. As such, it may be beneficial for researchers seeking to examine the effects of specific symptom clusters to include the General PTSD factor in their model. Additionally, it may also be helpful to re-evaluate past findings on specific PTSD symptom clusters and account for the General PTSD factor which may increase the consistency and accuracy of our knowledge in regard to PTSD and its symptoms.

Using a bi-factor model, we found Dysphoria and Hyperarousal to be associated with suicidal ideation at baseline. We found the Anxious Arousal factor to be associated with increases in the magnitude of suicidal ideation one month later even after controlling for baseline suicidal ideation. Specifically, increases in anxious arousal led to decreases in suicidal ideation. Although this is a potentially interesting finding, it should be interpreted with caution as our measure of anxious arousal was based on only two PCL-M items (i.e. Item 16: "Being 'super alert' or watchful on guard?"; Item 17: "Feeling jumpy or easily startled?") and this factor only accounted for 32% of the variance in these items. The General PTSD factor was also associated with baseline suicidal ideation when using a conventional *p* value (i.e., when not accounting for multiple comparisons). These findings differ from past

studies which found the Re-experiencing and Numbing symptom clusters of PTSD to contribute to suicidal ideation in military service members (Barr et al., 2016; Bell and Nye, 2007; Pennings et al., 2017). They are, however, tconsistent with past findings that Hyperarousal symptoms contribute to suicidal ideation (Brier et al., 2015; Pennings et al., 2017). One potential pathway by PTSD may lead to suicidal ideation is through increases in hopelessness (Klonsky and May 2015). Indeed, a past study examining hopelessness and suicidality in individuals (Panagioti et al., 2012) found that, even after controlling for depression, elevated levels of hopelessness, defeat, and entrapment in individuals with PTSD contributed to increased suicidality in individuals with PTSD. As such, providing veterans who are not engaged in mental health services, with hope may provide the motivation to engage in treatment and ameliorate suicidal ideation. In individuals without PTSD, overarousal, characterized by agitation and insomnia, has also been consistently found to be associated with increases in suicidal ideation (Dolsen et al., 2017; Ribeiro et al., 2012; Rogers et al., 2016). When the depression was added to the model at baseline, however, Hyperarousal symptoms was no longer a significant predictor of baseline suicidal ideation suggesting that the effect of hyperarousal symptoms on baseline suicidal ideation may be better accounted for by depressive symptoms.

The General PTSD factor was a significant predictor of suicidal behavior one month later, accounting for past suicidal behavior. Furthermore, even after accounting for the General PTSD factor, Re-experiencing symptoms also significantly contributed to the prediction of suicidal behavior one month later. These findings differ from past studies that reported Avoidance, Dysphoria, and Numbing symptom clusters as contributing to suicidal behavior in military populations (Barr et al., 2016; Legarreta et al., 2015; Pennings et al., 2017). They are, however, consistent with a past epidemiological study which found that the General PTSD factor was associated with increased suicide attempts using a bi-factor model (Chen et al., 2017). Theoretically, our findings also support the notion that the Re-experiencing symptoms of PTSD, like other repetitive negative thinking patterns found in other psychiatric disorders, may serve as a pathway by which suicidal ideation transitions into suicidal behavior in individuals diagnosed with PTSD (Law and Tucker, 2017). Several existing theories of suicide (Joiner, 2005; Klonsky and May, 2015), emphasize that an individual must possess an increased capability to tolerate distress and overcome an innate fear of death to engage in suicidal behaviors. Indeed, the Re-experiencing symptoms of PTSD has been found to elevate capability for suicidal behavior (Bryan and Anestis, 2011) and it was suggested that the aforementioned relationship was likely attributable to increases in familiarity towards violent, provocative, and dangerous images. To determine if the Re-experiencing symptoms of PTSD fit into the model of trans-diagnostic repetitive negative thinking patterns and to gain a better understanding of the mechanisms by which it increases risk for suicidal behavior, further study is warranted.

There are several limitations of this study that warrant some caution in interpreting the aforementioned results. Despite demonstrating that the best-fitting correlated factors model for the PCL-M was the modified DSM 5 five-factor solution, it is important to note that the PCL-M was designed to measure PTSD symptoms based on the DSM-IV-TR symptom criteria and not the updated DSM-5 criteria. While the PCL-M has demonstrated utility in approximating DSM-5 PTSD symptoms due to the substantial overlap between PTSD diagnostic criteria in the DSM-IV-TR and DSM-5 (Rosellini et al., 2015), its validity may still be compromised. As such, our findings may not provide an accurate reflection of the structure of PTSD based on the DSM-5 symptom criteria which could impact our findings regarding which specific PTSD symptom clusters contribute to suicidal ideation and behaviors. Replication of this study using the PCL-5 is warranted. This study also relied on self-report data which is vulnerable to error as participants may have difficulty retrospectively recalling their experiences that they

are asked to describe. Unfortunately, psychological variables, such as cognition and emotion, are difficult to measure with existing technology as they are often unobservable and prone to measurement error; thus, at this time, we can only rely on self-report data to measure an individual's experience.

The sample used for this study makes it difficult to generalize our findings to all individuals who are at risk for suicide. Specifically, our sample was largely comprised of white, male veterans. This makes it difficult to generalize our findings to individuals of other ethnic backgrounds, females, and civilians. At the same time, however, there is a dearth of suicide research on male individuals. As such, this large sample of male veterans can also be considered a strength of this study as it allows us to examine an understudied population that is at high risk for suicide. Another important characteristic of our sample is that the majority of individuals included in this study endorsed the presence of recent suicidal ideation and were not involved in mental health treatment. Thus, the results from this study may not lend itself to answering the question of whether PTSD symptoms predict the presence (vs. absence) of existing suicidal ideation and behavior. Rather, this study provides us with information regarding how PTSD symptoms contribute to the development and changes in the severity of suicidal ideation and behavior. Furthermore, the results from this study may not be generalizable to individuals who are involved in mental health treatment. Studies examining suicide risk and psychopathology, however, often do not specifically focus on individuals who are not seeking mental health treatment and research on this specific population is lacking. That being said, this study is unique in its ability to examine the effect of PTSD on suicidal ideation and behavior in the absence of mental health interventions.

Despite these limitations, this study provides the field with further insight into the relationship between PTSD and suicide, particularly in veterans who are not currently involved in mental health treatment. These results highlight the role of repetitive, intrusive thoughts in driving suicidal behavior and implicate these thoughts as an important target for treatment above and beyond general distress associated with PTSD. While the goal of treatment for PTSD may be generally focused on alleviating distress caused by symptoms of PTSD, such as managing avoidance and arousal symptoms in order to engage in meaningful activities, it would be important for clinicians to prioritize addressing violent repetitive and intrusive Re-experiencing symptoms when participants report suicidal ideation in order to mitigate risk for a future suicide attempt. When assessing for PTSD and PTSD symptoms, clinicians should be aware of changes in the frequency, duration, and content of their clients' repetitive, intrusive thoughts as these thoughts may increase their capability for inflicting non-lethal or lethal forms of self-injury. As patients are asked to confront (vs. avoid) Re-experiencing symptoms, it would be important for clinicians to be particularly attentive towards changes in capability for suicide particularly in fearlessness towards death, plans and preparations for suicide, and availability of means. It may also be beneficial for clinicians to help patients understand the difference between repetitive thoughts that are constructive and those that are destructive (Watkins, 2008) so that they can learn to reframe their Re-experiencing symptoms in a constructive manner. Specifically, clinicians can guide their patients to focus on finding positive outcomes from their experience in a general and abstract manner or to focus on negative experiences in a detailed and concrete manner which have been posited to influence to the constructive (vs. destructive) nature of repetitive thoughts (Watkins, 2008).

References

American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders, fifth ed. American Psychiatric Publishing, Arlington, VA.

Barr, N.U., Sullivan, K., Kintzle, S., Castro, C.A., 2016. PTSD symptoms, suicidality and non-suicidal risk to life behavior in a mixed sample of pre- and post-9/11 veterans. Soc. Work. Ment. Health. 14 (5), 465–473.

Bell, J.B., Nye, E.C., 2007. Specific symptoms predict suicidal ideation in Vietnam combat veterans with chronic post-traumatic stress disorder. Mil. Med. 172 (11), 1144–1147.

Bentler, P.M., 2009. Alpha, dimension-free, and model-based internal consistency reliability. Psychometrika 74, 137–143.

Ben-Ya'acov, Y., Amir, M., 2004. Posttraumatic symptoms and suicide risk. Pers. Individ. Dif. 36 (6), 1257–1264.

Boffa, J.W., Stanley, I.H., Hom, M.A., Norr, A.M., Joiner, T.E., Schmidt, N.B., 2017. PTSD symptoms and suicidal thoughts and behaviors among firefighters. J. Psychiatr. Res. 84277–84283.

Briere, J., Godbout, N., Dias, C., 2015. Cumulative trauma, hyperarousal, and suicidality in the general population: a path analysis. J. Trauma Dissociation 16 (2), 153–169.

Bryan, C., Anestis, M., 2011. Reexperiencing symptoms and the interpersonal-psychological theory of suicidal behavior among deployed service members evaluated for traumatic brain injury. J. Clin. Psychol. 67 (9), 856–865.

Byllesby, B.M., Elhai, J.D., Tamburrino, M., Fine, T.H., Cohen, G., Sampson, L., et al., 2017. General distress is more important than PTSD's cognition and mood alterations factor in accounting for PTSD and depression's comorbidity. J. Affect. Disord. 211, 118–123.

Chen, C.M., Yoon, Y., Harford, T.C., Grant, B.F., 2017. Dimensionality of DSM-5 posttraumatic stress disorder and its association with suicide attempts: results from the National Epidemiologic Survey on Alcohol and Related Conditions-III. Soc. Psychiatry Psychiatr. Epidemiol. 52 (6), 715–725.

Cleary, A., 2017. Help-seeking patterns and attitudes to treatment amongst men who attempted suicide. J. Ment. Health 26 (3), 220–224.

Cougle, J.R., Resnick, H., Kilpatrick, D.G., 2009. PTSD, depression, and their comorbidity in relation to suicidality: cross-sectional and prospective analyses of a national probability sample of women. Depress. Anxiety 26 (12), 1151–1157.

Curran, P.J., West, S., Finch, J.F., 1996. The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. Psychol. Methods 1 (1), 16–29.

Czyz, E.K., Horwitz, A.G., Eisenberg, D., Kramer, A., King, C.A., 2013. Self-reported barriers to professional help seeking among college students at elevated risk for suicide. J. Am. Coll. Health 61 (7), 398–406.

Dolsen, M.R., Cheng, P., Arnedt, J.T., Swanson, L., Casement, M.D., Kim, H.S., et al., 2017. Neurophysiological correlates of suicidal ideation in major depressive disorder: hyperarousal during sleep. J. Affect. Disord. 212, 160–166.

Giummarra, M.J., Casey, S.L., Devlin, A., Ioannou, L.J., Gibson, S.J., Georgiou-Karistianis, N., et al., 2017. Co-occurrence of posttraumatic stress symptoms, pain, and disability 12 months after traumatic injury. Pain reports 2 (5), e622.

Gorsuch, R.L., 1983. Factor Analysis, second ed. Lawrence Erlbaum, Hillsdale, NJ.

Gradus, J., Qin, P., Lincoln, A., Miller, M., Lawler, E., Sørensen, H., et al., 2010. Posttraumatic stress disorder and completed suicide. Am. J. Epidemiol. 171 (6), 721–727.

Grice, J.W., 2001. Computing and evaluating factor scores. Psychol. Methods 6, 430–450.

Hawton, K., Comabella, C.I., Haw, C., Saunders, K., 2013. Risk factors for suicide in individuals with depression: a systematic review. J. Affect. Disord. 147 (1–3), 17–28.

Hu, L., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct. Equ. Model. A Multidiscip. J. 6, 1–5.

Jakupcak, M., Cook, J., Imel, Z., Fontana, A., Rosenheck, R., McFall, M., 2009. Posttraumatic stress disorder as a risk factor for suicidal ideation in Iraq and Afghanistan War veterans. J. Trauma. Stress 22 (4), 303–306.

Joiner, T.E., 2005. Why people die by suicide. Harvard University Press, Cambridge, MA.

Kline, R.B., 2011. Principles and Practice of Structural Equation Modeling, third ed. The Guilford Press, New York.

Klonsky, E.D., May, A.M., 2014. Differentiating suicide attempters from suicide ideators: a critical frontier for suicidology research. Suicide Life Threat. Behav. 44 (1), 1–5.

Klonsky, E.D., May, A.M., 2015. The Three-Step Theory (3ST): a new theory of suicide rooted in the "ideation-to-action" framework. Int. J. Cogn. Ther. 8 (2), 114–129.

Krysinska, K., Lester, D., 2010. Post-traumatic stress disorder and suicide risk: a systematic review. Arch. Suicide Res. 14 (1), 1–23.

Law, K.C., Tucker, R.P., 2017. Repetitive negative thinking and suicide: a burgeoning literature with need for further exploration. Curr. Opin. Psychol. 2268–2272.

LeBouthillier, D.M., McMillan, K.A., Thibodeau, M.A., Asmundson, G.G., 2015. Types and number of traumas associated with suicidal ideation and suicide attempts in PTSD: findings from a U.S. nationally representative sample. J. Trauma. Stress 28 (3), 183–190.

Legarreta, M., Graham, J., North, L., Bueler, C.E., McGlade, E., Yurgelun-Todd, D., 2015. DSM-5 posttraumatic stress disorder symptoms associated with suicide behaviors in veterans. Psychol. Trauma 7 (3), 277–285.

Manea, L., Gilbody, S., McMillan, D., 2012. Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. Can. Med. Assoc. J. 184 (3), 191–196.

Martin, A., Rief, W., Klaiberg, A., Braehler, E., 2006. Validity of the brief patient health questionnaire mood scale (PHQ-9) in the general population. Gen. Hosp. Psychiatry 28 (1), 71–77.

MacCallum, R.C., Browne, M.W., Sugawara, H.M., 1996. Power analysis and determination of sample size for covariance structure modeling. Psychol. Methods 1, 130–149.

McDonald, R.P., 1999. Test Theory: A Unified Approach. Lawrence Erlbaum, Mahwah, NJ.

Mundt, J.C., Greist, J.H., Gelenberg, A.J., Katzelnick, D.J., Jefferson, J.W., Modell, J.G., 2010. Feasibility and validation of a computer-automated Columbia-Suicide severity rating scale using interactive voice response technology. J. Psychiatr. Res. 44, 1224–1228.

Muthén, L.K., Muthén, B.O., 1998. Mplus User's Guide, seventh ed. Los Angeles, CA.

Panagioti, M., Gooding, P.A., Tarrier, N., 2012. Hopelessness, defeat, and entrapment in posttraumatic stress disorder: their association with suicidal behavior and severity of depression. J. Nerv. Ment. Dis. 200 (8), 676–683.

Pennings, S.M., Finn, J., Houtsma, C., Green, B.A., Anestis, M.D., 2017. Posttraumatic stress disorder symptom clusters and the interpersonal theory of suicide in a large military sample. Suicide Life Threat. Behav. 47 (5), 538–550.

Posner, K., Brown, G.K., Stanley, B., Brent, D.A., Yershova, K.V, Oquendo, M.A., et al., 2011. The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. Am. J. Psychiatry 168, 1266–1277.

Reise, S.P., 2012. Invited Paper: the rediscovery of bifactor measurement models. Multivariate Behav. Res. 47, 667–696.

Ribeiro, J.D., Pease, J.L., Gutierrez, P.M., Silva, C., Bernert, R.A., Rudd, M.D., et al., 2012. Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military. J. Affect. Disord. 136 (3), 743–750.

Ribeiro, J., Silva, C., Joiner, T., 2014. Overarousal interacts with a sense of fearlessness about death to predict suicide risk in a sample of clinical outpatients. Psychiatry Res. 218 (1), 106–112.

Rogers, M.L., Tucker, R.P., Law, K.C., Michaels, M.S., Anestis, M.D., Joiner, T.E., 2016. Manifestations of overarousal account for the association between cognitive anxiety sensitivity and suicidal ideation. J. Affect. Disord. 192, 116–124.

Rosellini, A.J., Stein, M.B., Colpe, L.J., Heeringa, S.G., Petukhova, M.V., Sampson, N., et al., 2015. Approximating a DSM-5 diagnosis of PTSD using DSM-IV criteria. Depress. Anxiety 32 (7), 493–501.

Selaman, Z.H., Chartrand, H.K., Bolton, J.M., Sareen, J., 2014. Which symptoms of posttraumatic stress disorder are associated with suicide attempts? J. Anxiety Disord. 28 (2), 246–251.

Simon, G.E., Rutter, C.M., Peterson, D., Oliver, M., Whiteside, U., Operskalski, B., et al., 2013. Does response on the PHQ-9 depression questionnaire predict subsequent suicide attempt or suicide death? Psychiatr. Serv. 64, 1195–1202.

Spitzer, R.L., Williams, J.B.W., Kroenke, K., Linzer, M., Verloin, F., Hahn, S.R., et al., 1994. Utility of a new procedure for diagnosing mental disorders in primary care. J. Am. Med. Assoc. 272, 1749–1756.

Thibodeau, M.A., Welch, P.G., Sareen, J., Asmundson, G.J.G., 2013. Anxiety disorders are independently associated with suicide ideation and attempts: propensity score matching in two epidemiological samples. Depress. Anxiety 30 (10), 947–954.

US Department of Veterans Affairs, 2017. Suicide Among Veterans and Other Americans: 2001–2014. Retrieved from. https://www.mentalhealth.va.gov/docs/2016suicidedatareport.pdf.

Vujanovic, A.A., Bakhshaie, J., Martin, C., Reddy, M.K., Anestis, M.D., 2017. Posttraumatic stress and distress tolerance: associations with suicidality in acute-care psychiatric inpatients. J. Nerv. Ment. Dis. 205 (7), 531–541.

Watkins, L.E., Sippel, L.M., Pietrzak, R.H., Hoff, R., an Harpaz-Rotem, I., 2017. Co-occurring aggression and suicide attempt among veterans entering residential treatment for PTSD: the role of PTSD symptom clusters and alcohol misuse. J. Psychiatr. Res. 878 14.

Watkins, E.R., 2008. Constructive and unconstructive repetitive thought. Psychol. bull. 134 (2), 163–206.

Weathers, F.W., Litz, B.T., Herman, D.S., Huska, J.A., Keane, T.M., 1993. October. the PTSD Checklist (PCL): reliability, validity, and diagnostic utility. In: Annual Convention of the International Society for Traumatic Stress Studies. San Antonio, TX. 462.

Wilkins, K.C., Lang, A.J., Norman, S.B., 2011. Synthesis of the psychometric properties of the PTSD checklist (PCL) military, civilian, and specific versions. Depress. Anxiety 28, 596–606.

Yufik, T., Simms, L.J., 2010. A meta-analytic investigation of the structure of posttraumatic stress disorder symptoms. J. Abnorm. Psychol. 119 (4), 764–776.