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Psychological Inflexibility Predicts of Suicidal Ideation Over Time in Veterans of the Conflicts in Iraq and Afghanistan

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Abstract

Psychological inflexibility, or how individuals respond to distressing internal experiences, may be a modifiable risk factor for suicide in veterans. It was hypothesized that psychological inflexibility would predict suicidal ideation after accounting for established risk factors at baseline and 1 year later. Post-9/11 veterans ($N=309$) completed clinical interview and self-report measures at baseline and 1-year follow-up. Results indicated that psychological inflexibility predicted severity of suicidal ideation at both baseline and 1 year later, after accounting for established risk factors. Psychological inflexibility is an important marker of risk for suicidal ideation, and could be a target for interventions aimed at reducing suicide.

Suicide represents a significant public health crisis and is among the top 10 causes of death in the United States (CDC, 2015). Among veterans, suicide is even more prevalent despite aggressive efforts by the Department of Veterans Affairs (VA) to reduce suicide. According to a VA report (2016), approximately 20 veterans die every day from suicide. Thus, there is an urgent need to identify novel, modifiable risk factors for suicide to stem this crisis.

Multiple risk factors for suicide among veterans have been identified, including the presence of suicidal ideation; history of a prior suicide attempt; mental health problems including posttraumatic stress disorder (PTSD) and depression; problematic alcohol and substance use, including tobacco use; psychosocial problems; low resilience; low social support; hopelessness; childhood physical or sexual abuse; chronic pain; and physical injury (Angst, Stassen, Clayton, & Angst, 2002; Brenner, Ignacio, & Blow, 2011; DeBeer, Kimbrel, Meyer, Gulliver, & Morissette, 2014; DeVivo, Black, Richards, & Stover, 1991; Dube et al., 2001; Hemmingsson & Kriebel, 2003; Jakupcak et al., 2009; Lemaire & Graham, 2011; Nordström, Samuelsson, & Åsberg, 1995; Pietrzak et al., 2010; Ratcliffe, Enns, Belik, & Sareen, 2008). One of the strongest proximal predictors of suicide is suicidal ideation (Angst et al., 2002), making it a critical marker of suicide risk. Similarly, the presence of a prior suicide attempt is a strong predictor of future suicidal ideation and behavior (Kessler, Borges, & Walters, 1999; Nock & Kessler, 2006; Nordström et al., 1995). Enhancing understanding of factors that predict future suicide risk while accounting for known risk factors is imperative for advancing this literature and for identifying novel treatment targets.

Major factors contributing to the high rates of suicide among veterans are high rates of PTSD, depression, alcohol, and other substance use disorders. A recent meta-analysis estimated that 23% of veterans of the wars in Iraq and Afghanistan have a diagnosis of PTSD (Fulton et al., 2015). Estimates regarding rates of major depressive disorder (MDD) range from 5% to 39% of veterans who served in the conflicts in Iraq and Afghanistan (Curry et al., 2014; Haskell et al., 2010; Ramsey et al., 2017; Seal, Bertenthal, Miner, Sen, & Marmar, 2007). PTSD and MDD are the two most common mental health diagnoses among veterans enrolled for VA health care (Watson & Pinkus, 2011). PTSD and depression often co-occur and have several overlapping symptoms (DeBeer et al., 2014; Koenen et al., 2008; Seal et al., 2007). Furthermore, the presence of these disorders increases the risk of suicidal ideation and behavior (Bryan & Corso, 2011; Jakupcak et al., 2009; Panagioti, Gooding, & Tarrier, 2009; Pukay-Martin et al., 2012; Rudd, Goulding, & Bryan, 2011; Sher, Braquehais, & Casas, 2012). Recent research has indicated that comorbid PTSD and depression predict suicide attempts 1 year later, and individuals with comorbid PTSD/MDD are more likely to have had a suicide attempt in the following year than those who had either PTSD or MDD alone (Kimbrel, Meyer, DeBeer, Gulliver, & Morissette, 2016).

High rates of substance misuse have likewise been reported among returning service members (5%–39%; Eisen et al., 2012; Ramsey et al., 2017; Seal et al., 2007, 2011). Alcohol and substance use are known contributors to both suicidal ideation and behavior (Aharonovich, Liu, Nunes, & Hasin, 2002; Borges, Walters, & Kessler, 2000; Preuss et al., 2002). Specifically, even when controlling for other sociodemographic risk factors and comorbid psychiatric disorders, substance and alcohol use as well as problematic consequences associated with alcohol use predict suicidal ideation and behavior (Borges

et al., 2000; Elliott, Pages, Russo, Wilson, & Roy-Byrne, 1996; Lamis, Leenaars, Jahn, & Lester, 2013). Further, more severe alcohol and substance dependence is associated with risk for suicide attempts (Hakansson, Bradvik, Schlyter, & Berglund, 2010; Preuss et al., 2002).

Although numerous risk factors for suicide have been identified, few empirical studies have examined risk factors that relate to the function of suicidal thoughts and behavior. Escape from the experience of psychological pain has been theorized as a primary function of suicide (Baumeister, 1990; Li et al., 2014; Mee, Bunney, Reist, Potkin, & Bunney, 2006; Shneidman, 1993). Consistent with the escape theory of suicide is the notion that attempting to avoid or escape from emotional distress is a key factor underlying multiple forms of psychopathology and suicide (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). However, little empirical research to date has examined the tendency to avoid or escape from psychological pain as a risk factor for suicide. *Psychological inflexibility* refers to the dominance of avoidance-based psychological reactions to unwanted internal experiences such as emotions, cognitions, and physiological sensations compared to the influence of one's values in guiding behavioral choices (Bond et al., 2011). Psychological inflexibility encompasses the closely linked but narrower construct of experiential avoidance, which occurs when one is unwilling or unable to remain in contact with unwanted internal experiences and takes steps to avoid, escape from, or alter the experience (Bond et al., 2011; Hayes, Strosahl, & Wilson, 2012; Hayes et al., 1996). Psychological inflexibility is associated with several other mental health problems that increase risk for suicide, including PTSD, depression, borderline personality disorder, and substance misuse (Bond et al., 2011; Chawla & Ostafin, 2007; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Psychological inflexibility is strongly associated with PTSD symptom severity in war veterans (Bryan, Ray-Sannerud, & Heron, 2015; Meyer, Morissette, Kimbrel, Kruse, & Gulliver, 2013), even after accounting for the avoidance symptoms of PTSD (Meyer et al., 2013). Initial evidence indicates that psychological inflexibility may be linked to suicidal ideation (Bryan et al., 2015; Walser et al., 2015). Importantly, psychological inflexibility is modifiable via a range of psychosocial interventions (Arch et al., 2012; Hayes et al., 2006; Walser, Karlin, Trockel, Mazina, & Taylor, 2013). Recently, a large study examining Acceptance and Commitment Therapy (ACT), which seeks to reduce psychological inflexibility as a treatment for depression among veterans, found that psychological inflexibility was associated with suicidal ideation at baseline and that decreases in psychological inflexibility during treatment were associated with decreases in suicidal ideation (Walser et al., 2015). Thus, psychological inflexibility is a modifiable, transdiagnostic factor that characterizes how people respond to unwanted internal experiences such as emotional pain, which is a key element of overall psychological health (Kashdan, Barrios, Forsyth, & Steger, 2006; Kashdan & Kane, 2011) and is associated with suicidal ideation in veterans (Bryan et al., 2015; Walser et al., 2015).

Objective and Hypothesis

In the present research we examined whether psychological inflexibility contributed to the prediction of suicidal ideation over time after accounting for commonly occurring mental health conditions in returning veterans known to be associated with increased risk for suicide (PTSD, depression, negative consequences of alcohol and substance use) and prior history

of suicide attempt(s), and baseline suicidal ideation for the 1-year follow-up model. We hypothesized that psychological inflexibility would be associated with severity of suicidal ideation at baseline and would predict severity of suicidal ideation at 1-year follow-up after accounting for the aforementioned risk factors.

METHODS

Participants

U.S. veterans of the wars in Iraq and Afghanistan enrolled for care at a VA medical center in the south-central United States ($N = 345$) were recruited to participate in Project SERVE: FX, a longitudinal assessment study that examined predictors of post-deployment mental health and functional outcomes. Recruitment was conducted through multiple channels including: presentations to VA staff, advertisements at veterans' service organizations and enrollment sites, and letters mailed to Iraq/Afghanistan veterans enrolled in the local VA health care system. Exclusion criteria for the study were as follows: (1) bipolar or psychotic disorder diagnosis; (2) suicidal or homicidal ideation intent or plan that was so severe that it warranted immediate crisis intervention; (3) plans to move out of the area within 4 months of baseline; or (4) having recently initiated psychiatric medications or psychotherapy if receiving such treatment. We over-sampled for veterans with PTSD and depression and for female veterans, consistent with the goals of the broader study on which the current analyses are based. A total of 36 participants were deemed ineligible due to the presence of one or more exclusionary criteria. Twenty-one participants were excluded due to mania or psychosis, 13 did not complete the baseline assessment, 1 was not an Iraq/Afghanistan veteran, and 1 participant planned to move out the area, resulting in a final sample of 309 eligible participants. No participants were deemed ineligible due to suicidal or homicidal crisis. Of the final sample, 276 (89.3%) completed the 1-year follow-up. The full sample was used for the baseline analyses, but only those who completed the follow-up were included in the longitudinal analyses.

The majority of the sample was male (67.6%). The average age of participants was 38.8 years ($SD = 9.8$). In terms of ethnicity, 19.7% identified as being Hispanic. In terms of race, 58.5% identified as White, 33.3% as Black, 5.6% as Native American/Alaska Native, 2.0% as Asian, 1.7% as Hawaiian/Pacific Islander, and 5.3% as "Other" (categories were not mutually exclusive). The average education level of the sample was 14.2 years ($SD = 2.1$ years). The majority of participants served in the Army (86.2%). In addition, 6.5% served in the Air Force, 4.9% in the Marine Corps, 3.3% in the Navy, and 8.2% in the National Guard (categories were not mutually exclusive). The mean time since last deployment was 57.34 months ($SD = 27.65$).

Procedures

This study represents secondary analysis of a larger longitudinal assessment study. Prior to the start of the study, procedures were approved by the local institutional review board. Following initial phone screening for eligibility, veterans were scheduled for an in-person appointment. Informed consent was obtained at the start of the baseline assessment during which final eligibility was confirmed. Veterans completed a clinical interview and a battery

of self-report measures at the baseline assessment. The Columbia Suicide Severity Rating Scale (CSSRS; Posner et al., 2011) was re-administered in-person at 1-year follow-up. Participants were compensated for their time.

Measures

Inclusion/Exclusion Criteria.—To exclude those meeting criteria for psychosis or bipolar disorder, the Mini International Neuropsychiatric Interview (Sheehan et al., 1998) was administered to screen for these disorders based on criteria in the *Diagnostic and Statistical Manual for Mental Health Disorders, Fourth Edition* (DSM-IV; APA, 2000).

Demographic Information.—A demographic questionnaire assessed participant characteristics including age, gender, race and ethnicity, relationship status, cohabitation status, education, employment, income, and military service characteristics.

PTSD Diagnosis and Symptom Severity.—The Clinician Administered PTSD Scale for DSM-IV (CAPS; Blake et al., 1995) is a clinician-administered diagnostic interview that assesses both the intensity and frequency of PTSD symptoms according to DSM-IV criteria. The CAPS provides a continuous score as well as a categorical PTSD diagnosis. The CAPS was administered based on the most traumatic experience during an OEF/OIF/OND deployment. If a participant did not endorse a potentially traumatic event that met full Criterion A, the CAPS was conducted on an event that met Criterion A1 (i.e., an event involving actual or threatened death or serious injury, or a threat to the physical integrity of self or others), which was identified by the participant as being the worst event experienced. In the unusual event that no such event could be identified, interviewers administered the CAPS based on general deployment stress. Thus, a continuous PTSD symptom severity score could be derived for all participants; however, a diagnosis of PTSD was only given when the participant's traumatic event met DSM-IV Criterion A. The majority of the sample (89.2%) reported events that met Criterion A. Symptoms were assessed during the past 30 days. Internal consistency for the CAPS in the current study was 0.98.

Diagnoses of MDD and Substance Use Disorders.—Diagnoses of MDD and substance use disorders were assessed with the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 2002). The SCID is a clinician-administered interview for the Axis I disorders of the DSM. Both current and lifetime diagnoses were assessed.

MDD Symptoms.—The Beck Depression Inventory-II (BDI-II; Beck, Steer, Ball, & Ranieri, 1996) is a 21-item self-report measure of depressive symptoms. Participants rate symptoms of depression in the past 2 weeks on a Likert scale of 0 (*no depressive symptoms*) to 3 (*severe depressive symptoms*). Scores above 30 on this measure indicate severe depression; scores of 19–29 indicate moderate depression; scores of 10–18 indicate mild depression, and scores of 9 or below indicate negligible depression (Beck, Steer, & Carbin, 1988). The BDI-II has high internal consistency (Beck et al., 1996) and good test–retest reliability (Beck et al., 1996). In the current study, the BDIII item that assesses suicidal ideation and intent was removed to minimize overlap between the predictor (depressive

symptoms) and the outcome variable (suicidal ideation). Internal consistency in the current study was 0.94.

Consequences of Alcohol Use.—The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) is a 23-item self-report measure designed to measure problems related to drinking (e.g., “Got into fights, acted bad, or did mean things”). Participants rate each item from 1 (*never*) to 5 (*always or almost always/more than 10 times*). It has demonstrated good internal consistency (White & Labouvie, 1989). Internal consistency for the RAPI in the current study was 0.95.

Drug Use.—The Drug Abuse Screening Test (DAST; Skinner, 1982) measures problems related to drug abuse using 20 items scored dichotomously (i.e., yes or no; e.g., “Have you lost friends because of your drug use?”). Prior research demonstrates that the DAST has good reliability and validity (Skinner, 1982). Internal consistency for the DAST in the current study was 0.86.

Suicidal Ideation and Behavior.—The CSSRS (Posner et al., 2011) is a clinician-administered interview that assesses suicidal ideation and behavior (including attempts, aborted or interrupted attempts, and non-suicidal self-injury). The CSSRS measures severity of suicidal ideation for both lifetime history and during the past 30 days on a 5-point ordinal scale (1 = *wish to be dead*, 5 = *Active suicidal ideation with specific plan and intent*). Additionally, the CSSRS measures lifetime suicide attempts both continuously, yielding a total number over the lifetime and past 30 days, as well as a dichotomous score. The dichotomous score was used in the subsequent analyses. The CSSRS was administered during the baseline assessment and 1-year follow-up. The CSSRS has good internal consistency (Posner et al., 2011) and interrater reliability (Stavarski et al., 2011). Internal consistency in this study was $\alpha = .76$.

Psychological Inflexibility.—The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011), a revised version of the original AAQ (Hayes, Strosahl, Wilson, & Bissett, 2004), was used to assess psychological inflexibility. The AAQ-II is a 7-item self-report measure that uses a 7-point Likert scale (e.g., “I’m afraid of my feelings” and “Emotions cause problems in my life”; 1 = *never true*; 7 = *always true*). Lower scores reflect higher levels of psychological inflexibility. The AAQ-II exhibits a single factor structure, good internal consistency, good test–retest reliability, and strong convergent associations with measures of thought suppression, depression, anxiety, and global distress (Bond et al., 2011). In war veterans, lower AAQ-II scores are associated with greater PTSD symptom severity and suicidal ideation (Bryan et al., 2015; Meyer et al., 2013). Internal consistency in the current study was 0.93.

Data Analytic Plan.—Two separate hierarchical regression models were tested. Baseline suicidal ideation severity served as the dependent variable in the first model, whereas 1-year suicidal ideation severity served as the dependent variable in the second model. Gender, age, education level, prior suicide attempt history, composite PTSD–depression severity scores, and alcohol and substance use consequences were entered into the first step of the model to account for these variables, as they are associated with suicidal ideation.

The 1-year model was the same, except baseline suicidal ideation was also entered into the first step. A composite PTSD-depression factor was used based on the high rates of co-occurrence observed between PTSD and MDD (e.g., Elhai et al., 2011; Gros, Price, Magruder, & Frueh, 2012; Miller, Fogler, Wolf, Kaloupek, & Keane, 2008), as well as evidence for a higher-order PTSD-depression factor in Iraq/Afghanistan veterans (e.g., Kimbrel et al., 2014). Finally, psychological inflexibility was entered into the second step of the model to determine whether psychological inflexibility contributed to the prediction of suicidal ideation severity over and above the other established risk factors. All analyses were conducted in Mplus using maximum likelihood estimation with robust standard errors (MLR) to estimate parameters (Muthén & Muthén, 2008). MLR was selected for the current analyses because it is more robust to moderate violations of normality assumption, which is critical when evaluating data on suicidal ideation.

RESULTS

A significant minority of the sample (27.5%) met full diagnostic criteria for military-related PTSD at the baseline assessment using the CAPS. Further, 19.4% met full diagnostic criteria for current MDD, 2.3% met criteria for current alcohol abuse, while 13.3% met for current alcohol dependence (see Table 1 for more information regarding substance use disorder rates in the sample and Table 2 for means and standard deviations of independent and dependent variables). There was a high correlation between CAPS and BDI scores, $r = .73, p < .001$, and also between RAPI and DAST scores, $r = .37, p < .001$ (see Table 3 for further details).

Of the entire sample, 9.9% ($n = 30$) endorsed suicidal ideation on the CSSRS during the past 30 days at baseline, whereas 14.2% ($n = 47$) endorsed suicidal ideation during the past 30 days at the annual follow-up. One (0.3%) participant endorsed suicidal intent with plan at both baseline and annual follow-up. Thirty (9.9%) participants reported at least one lifetime suicide attempt at baseline. In addition, eight (3.1%) participants attempted suicide during the 1 year of study enrollment. There were no suicide deaths during the study. Additionally, there was no change in severity of suicidal ideation in the last 30 days from baseline to follow-up ($t(275) = -0.97, p = .330$).

Factor Analysis

A principal component analysis (PCA) was conducted to create a factor for PTSD-depression symptom severity derived from the CAPS total symptom score and the BDI-II (e.g., DeBeer et al., 2014). A single factor was extracted from these measures that accounted for 86.4% of the variance in these measures. Both measures loaded highly onto the composite factor (CAPS = .93, BDI-II = .93), which indicates that these symptoms represent a single underlying factor. This composite score from the PCA was used in the regression analyses to minimize multicollinearity.

Regression Analyses

Baseline Suicidal Ideation.—Hierarchical linear regression was used to test the hypothesis that psychological inflexibility would be associated with baseline suicidal ideation severity above and beyond the other established predictors. The dependent variable

was the CSSRS suicidal ideation severity score from the past 30 days at baseline. As outlined in Table 4, factors that were associated with suicidal ideation in step 1 of the model were a prior suicide attempt, $\beta = .19, p = .001$, PTSD-depression symptom severity, $\beta = .24, p < .001$, and alcohol consequences, $\beta = .21, p < .001$. In step 2, consistent with the hypothesis, psychological inflexibility was associated with suicidal ideation severity after accounting for all other factors, $\beta = .19, p = .02$. Among all factors, psychological inflexibility was most strongly associated with suicidal ideation severity. It accounted for 1% of unique variance after accounting for all other well-replicated predictors of suicidal ideation ($p = .02$). Several other variables became or remained significant in the final step of the model including: age, $\beta = .12, p = .04$; suicide attempt history, $\beta = .17, p = .003$; and alcohol consequences, $\beta = .20, p < .001$. The overall model accounted for 26% of the variance in suicidal ideation severity at baseline.

Suicidal Ideation at 1-Year Follow-Up.—Hierarchical linear regression was used to test the hypothesis that psychological inflexibility would longitudinally predict suicidal ideation severity at 1-year follow-up above and beyond the other established predictors. The dependent variable in this model was the CSSRS suicidal ideation severity score from the past 30 days assessed during the 1-year follow-up. As can be seen in Table 5, the only significant predictors in the first step of the model were education level, $\beta = .12, p = .04$, and baseline suicidal ideation, $\beta = .57, p < .001$. In the second step, psychological inflexibility was a significant predictor of suicidal ideation severity at 1-year follow-up after accounting for all other variables, $\beta = .19, p = .03$. Education level and baseline suicidal ideation remained significant predictors in the second step of the model (education level: $\beta = -.13, p = .02$; baseline suicidal ideation, $\beta = .55, p < .001$). Overall, the model explained 33% of the variance in 1-year suicidal ideation severity, and psychological inflexibility accounted for 1% of unique variance above and beyond all other predictors.

DISCUSSION

The findings from the current study indicate that psychological inflexibility is a significant predictor of suicidal ideation over time in war veterans after accounting for the established risk factors of prior suicide attempts, PTSD, depression, and alcohol and substance problems, and baseline suicidal ideation for the follow-up analyses. Several factors that were associated with suicidal ideation severity at baseline did not predict suicidal ideation severity at the 12-month follow-up, including suicide attempt history, the PTSD-depression factor, and alcohol use disorder symptoms. This is likely due to the fact that baseline suicidal ideation was controlled for in the follow-up model. The overall proportion of variance in suicidal ideation severity accounted for by the model increased from baseline (27%) to follow-up (33%). This increase in variance was likely due to adding baseline suicidal ideation to the model. Overall, psychological inflexibility remained a predictor of suicidal ideation severity over time over and above well-established predictors of suicidal ideation. These findings suggest that psychological inflexibility is a marker of increased risk for suicidal ideation, one of the strongest proximal risk factors for suicide.

Psychological inflexibility was a significant longitudinal predictor of suicidal ideation severity at both the baseline assessment and the 12-month follow-up. A likely explanation

for these findings is that psychological inflexibility is a marker of motivation to escape from psychological pain. Indeed, studies of suicide notes reveal a collective thread of psychological pain (Leenaars, 1995; Orbach, Mikulincer, Gilboa-Schechtman, & Sirota, 2003; Shneidman, 1993; Valente, 1994). Severity of psychological pain is associated with suicidal ideation and behavior (Berlim et al., 2003; Levi et al., 2008; Olie, Guillaume, Jausse, Courtet, & Jollant, 2010) even after accounting for depression and hopelessness (Berlim et al., 2003). Thus, those with greater psychological inflexibility may be more likely to experience suicidal ideation as a means of distancing or escaping from psychological pain. Importantly, psychological inflexibility is a transdiagnostic factor that can be modified through a range of treatment interventions.

While our hypotheses regarding psychological inflexibility predicting suicidal ideation severity over time were supported, there were some surprising findings regarding the relations among alcohol and substance problems and suicidal ideation severity. While alcohol and other substance use symptoms were both associated with suicidal ideation at baseline, neither were significant predictors of suicidal ideation at follow-up. It is possible that these findings are a result of controlling for baseline suicidal ideation. Or, these findings may suggest that suicidal ideation is related to current alcohol- and substance-related problems, but that alcohol- and substance-related problems did not have lingering effects on suicidal ideation 1 year later.

The present findings are highly relevant to the assessment and treatment of veterans. Of particular importance, psychological inflexibility is modifiable. Treatments such as ACT directly target psychological inflexibility and seek to increase acceptance and willingness in relation to unwanted internal experiences. There is empirical support for ACT with a range of problems associated with increased risk for suicide including depression (Forman, Herbert, Moitra, Yeomans, & Geller, 2007; Lappalainen et al., 2007; Walser et al., 2013; Zettle & Hayes, 1986), anxiety (Arch et al., 2012; Forman et al., 2007; Zettle, 2012), psychosis (Bach & Hayes, 2002; Gaudiano & Herbert, 2006), borderline personality disorder (Gratz & Gunderson, 2006), substance use disorders (Bricker, Wyszynski, Comstock, & Heffner, 2013; Gifford et al., 2004; Hayes et al., 2004), chronic pain (McCracken & Vowles, 2014; Vowles, Witkiewitz, Sowden, & Ashworth, 2014), and some case examples suggesting its potential utility with PTSD (Batten & Hayes, 2005; Burrows, 2013). Finally, a large effectiveness study of ACT for depression found that ACT was effective in reducing suicidal ideation in veterans, and that reductions in suicidal ideation were associated with reductions in psychological inflexibility (Walser et al., 2015). Thus, ACT may have utility in the treatment of suicidal behavior as well. For example, ACT targets reduced avoidance and escape from psychological pain. ACT teaches mindfulness and acceptance-based skills for remaining present with emotional distress. Moreover, ACT emphasizes value-driven living, which enhances peoples' sense of meaning and purpose, a predictor of positive response to cognitive behavioral therapy for suicide (Bryan, 2007). ACT is a treatment approach designed to directly target psychological inflexibility, whereas studies of other treatment approaches do not typically measure psychological inflexibility. However, one trial indicates that cognitive behavioral therapy reduces psychological inflexibility among people with mixed anxiety disorders (Arch et al., 2012). Overall, it is largely unknown to what extent changes in psychological inflexibility

may be a mechanism of change in evidence-based psychosocial treatments that target mental health problems associated with suicide risk or those that directly target suicide risk (e.g., Bryan, 2007; Eftekhari et al., 2013; Rudd et al., 2015). Future research is warranted to further examine the relationships between psychological inflexibility and suicidal ideation and behavior, including examining the effect of treatments that reduce psychological inflexibility on reducing suicide risk. To date, no study has examined the relationship between psychological flexibility and suicide attempts or death by suicide.

Strengths and Limitations

While this study has many strengths, including the use of gold-standard clinical interviews to assess suicidal ideation and current mental health diagnoses, several limitations warrant discussion. First, participants were veterans enrolled in VA health care. Therefore, these findings may not generalize to veterans outside of the VA system or to civilian populations. Second, the study relied largely on self-report measures for psychological inflexibility, depressive symptoms, and substance and alcohol use. However, gold-standard clinical interview measures were used to assess for suicidal ideation severity and suicide attempts, PTSD symptom severity, and traumatic brain injury. Further, a relatively small portion of our sample endorsed suicidal ideation in the past 30 days at baseline (10%) and follow-up (14%). Conversely, given the relatively low endorsement of suicidal ideation and associated restricted variability, the ability of the current study to detect an association between psychological inflexibility and suicidal ideation severity may actually underscore the strength of this relationship. The current study indicates that psychological inflexibility is a key marker of suicide risk in veterans, even after accounting for several robust predictors, suggesting that increased attention be paid to this risk factor as part of treatment and prevention efforts aimed at stemming the tide of suicide among this high risk population.

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TABLE 1

Number and Percent of Participants with Current and Lifetime PTSD, MDD, and Alcohol/Substance Use Disorders

Diagnosis	Current <i>n</i> (%)	Lifetime <i>n</i> (%)
PTSD	84 (27.2)	154 (49.8)
MDD	60 (19.4)	147 (47.6)
Alcohol		
Dependence	41 (13.3)	95 (30.7)
Abuse	7 (2.3)	44 (14.2)
Sedatives		
Dependence	0 (0)	2 (0.6)
Abuse	2 (0.6)	2 (0.6)
Cannabis		
Dependence	6 (1.8)	15 (4.9)
Abuse	3 (1.0)	29 (9.4)
Stimulants		
Dependence	4 (1.3)	4 (1.3)
Abuse	0 (0)	1 (0.3)
Opioids		
Dependence	2 (0.9)	5 (1.6)
Abuse	1 (0.3)	2 (0.6)
Cocaine		
Dependence	5 (1.6)	13 (4.2)
Abuse	0 (0)	1 (0.3)
Hallucinogen		
Dependence	0 (0)	1 (0.3)
Abuse	1 (0.3)	3 (1.0)

PTSD, posttraumatic stress disorder; MDD, major depressive disorder.

TABLE 2

Means and Standard Deviations of Independent and Dependent Variables

Measure	Mean	SD
AAQ-II	19.49	9.74
Severity of suicidal ideation past 30 days baseline	0.20	0.69
Severity of suicidal ideation past 30 days follow-up	0.25	0.71

AAQ, Acceptance and Action Questionnaire.

TABLE 3

Correlations Between Items of Interest

Measure	1	2	3	4	5	6	7	8	9
1. Gender	-	.111	-.168**	-.051	.146*	-.025	-.152**	.022	
2. Age	-	-	-.106	-.090	-.126*	.026	-.218**	-.070	
3. AAQ-II	-	-	-	.316**	.190**	.376**	.265**	.246**	
4. RAPI	-	-	-	-	.365**	.314**	.265**	.209**	
5. DAST	-	-	-	-	-	.254**	.236**	.123*	
6. Baseline suicidal ideation severity	-	-	-	-	-	-	.246**	.503**	
7. Suicide attempt history	-	-	-	-	-	-	-	.224**	
8. Follow-up suicidal ideation severity	-	-	-	-	-	-	-	-	
9. PTSD/MDD factor	-	-	-	-	-	-	-	-	

PTSD, posttraumatic stress disorder; MDD, major depressive disorder; RAPI, Rutgers Alcohol Problem Inventory; DAST, Drug Abuse Screening Test; AAQ, Acceptance and Action Questionnaire.

* $p < .05$,

** $p < .005$.

TABLE 4

Summary of Regression Model Predicting Baseline Suicidal Ideation

	<u>Suicidal Ideation</u>	
	R^2	β
Step 1	.25 ***	
Gender		.01
Age		.11
Education level		.09
Suicide attempt history		.19 **
PTSD-depression factor		.24 ***
DAST		.11
RAPI		.20 **
Step 2	.01 *	
Gender		.01
Age		.12 *
Education level		.08
Suicide attempt history		.17 **
PTSD-depression factor		.10
DAST		.11
RAPI		.20 **
AAQ-II		.19 *
Total R^2	.26	

PTSD, posttraumatic stress disorder; RAPI, Rutgers Alcohol Problem Inventory; DAST, Drug Abuse Screening Test; AAQ, Acceptance and Action Questionnaire.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

TABLE 5

Summary of Regression Model Predicting 1-Year Follow-up Suicidal Ideation

	<u>Suicidal Ideation</u>	
	<i>R</i> ²	β
Step 1	.32 ***	
Gender		-.08
Age		-.02
Education level		-.12 *
Suicide attempt history		.11
Baseline suicidal ideation		.57 ***
PTSD-depression factor		-.11
DAST		-.01
RAPI		.03
Step 2	.01 *	
Gender		-.07
Age		-.03
Education level		-.13 *
Suicide attempt history		.09
Baseline suicidal ideation		.55 ***
PTSD-depression factor		-.24 **
DAST		-.01
RAPI		.03
AAQ-II		.19 *
Total <i>R</i> ²	.33	

PTSD, posttraumatic stress disorder; RAPI, Rutgers Alcohol Problem Inventory; DAST, Drug Abuse Screening Test; AAQ, Acceptance and Action Questionnaire.

* $p < .05$,

** $p < .01$,

*** $p < .001$.