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Cognitive reappraisal moderates the relationship between PTSD symptoms and alcohol use over time in post-9/11 U.S. military veterans

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ABSTRACT

Background: Rates of comorbid alcohol use disorder (AUD) and posttraumatic stress disorder (PTSD) are increasing among post-9/11 veterans, and emotion regulation problems have been identified as a feature of both disorders. However, no studies to date have explored how individual differences in emotion regulation may moderate the relationship between PTSD symptoms and alcohol use. We evaluated how two core emotion regulation strategies – one adaptive (i.e., cognitive reappraisal) and one maladaptive (i.e., expressive suppression) are related to PTSD symptoms and alcohol use over one-year.

Methods: A total of 71 post-9/11 veterans (12 female, 59 male) completed a baseline screening and at least two follow-up assessments over the course of 12 months which included measures of emotion regulation, PTSD symptoms, and alcohol use. A mixed growth model was utilized to determine if changes in PTSD symptoms covaried with alcohol use over time and whether this relation was moderated by frequency of use of emotion regulation strategies.

Results: In general, higher PTSD symptoms were significantly associated with greater alcohol use, but cognitive reappraisal moderated this relationship. Specifically, at low cognitive reappraisal, greater PTSD symptoms were associated with greater alcohol use. At high cognitive reappraisal, there was no significant association between PTSD symptoms and alcohol use.

Conclusions: Findings from the present study suggest that baseline individual differences in cognitive reappraisal influence the relation between PTSD symptoms and alcohol use. For post-9/11 veterans, high levels of cognitive reappraisal may serve as a protective factor against ongoing alcohol use.

1. Introduction

Alcohol use disorder (AUD) is a common diagnosis among post-9/11 U.S. military veterans [veterans of Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Operation New Dawn (OND), and other post-9/11 military campaigns]. In this population of approximately 2.6 million individuals, AUD has been associated with increased physical health problems/disease burden over time (McGlinchey et al., 2017; O'Neil et al., 2013; Possemato et al., 2010). Rates of recent heavy drinking and binge drinking have ranged from 14 to 44% in U.S. military veterans (Allen et al., 2016). Additionally, AUD commonly co-occurs with post-traumatic stress disorder (PTSD) in military populations, with a rate of comorbidity of 26.5% and rates of both disorders rising over the past decade (Allen et al., 2016). Indeed, Seal et al. (2011) found that among OEF/OIF veterans with AUD, post-deployment rates of PTSD ranged from 63 to 76%, and these rates can be further complicated by other comorbidities such as mTBI (McGlinchey et al., 2017). It has been demonstrated that PTSD symptoms influence the course of drinking over time (McFarlane, 1998), though fewer studies have investigated these associations longitudinally in veterans (e.g., Shipherd et al., 2005) or post-9/11 veterans specifically. Given the large number of post-9/11 veterans that have been diagnosed with PTSD, it is critical to understand how PTSD and AUD interact over time within this group to inform treatment practices.

One potential explanation of the association between PTSD symptoms and alcohol use is the negative reinforcement model (Baker et al.,

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2004), which posits that alcohol use continues as a means of alleviating emotional distress through self-medication. However, not all individuals with PTSD use alcohol, and there are mixed results regarding the association between PTSD and alcohol use in prior longitudinal studies (McFarlane, 1998). Thus, there may be important moderators, such as emotion regulation strategies, that influence initiation and course of drinking in PTSD populations. Because emotion regulation is often a treatment target for AUD and PTSD, it would be important to explore this construct in post-9/11 veterans and how it may interact with PTSD and alcohol use over time.

Prior work has suggested that emotion dysregulation likely impacts alcohol use and AUD treatment outcomes. For instance, emotional dysregulation has been consistently shown in individuals with AUD relative to control subjects both cross-sectionally and longitudinally (e.g., Berking et al., 2011; Ghorbani et al., 2017); findings suggest difficulties with adaptive emotion regulation (low use of successful emotional regulation strategies), increased suppression of emotions, and more overall negative affect (as an outcome) in AUD subjects. Emotional dysregulation in AUD has also been associated with other problems, such as increased suicide risk in AUD outpatients cross-sectionally (Ghorbani et al., 2017), and is especially salient during early abstinence from substance use (Fox et al., 2008). While there is some evidence that duration of abstinence has been associated with improvements in emotional regulation (Petit et al., 2015), some emotion regulation deficits may persist beyond acute treatment efforts (Fox et al., 2008), suggesting that these deficits may be a causal and maintaining factor in predicting alcohol use.

Understanding more specific emotional regulation deficits in AUD may have important treatment implications in the short- and long-term. Additionally, the use of adaptive vs. maladaptive emotion regulation strategies warrants consideration, as these are common treatment targets. For instance, Berking et al. (2011) found in a longitudinal study that general emotional dysregulation was predictive of alcohol use during and after outpatient AUD treatment. On the other hand, tolerating negative emotions (an adaptive strategy) predicted lower alcohol use during and after treatment (Berking et al., 2011). Relative to controls, Petit et al. (2015) found that patients with AUD reported *lower* use of adaptive strategies such as cognitive reappraisal and *higher* use of maladaptive (response modulation) strategies such as expressive suppression (where an individual attempts to hide his/her emotional state) in a cross-sectional study. Notably, ongoing use of maladaptive emotion regulation strategies was associated with greater craving in AUD subjects (Petit et al., 2015). Further, among AUD subjects in outpatient treatment, *higher* use of adaptive cognitive reappraisal strategies has been shown to be associated with *lower* suicide risk cross-sectionally (Ghorbani et al., 2017), which suggests that this specific component of emotion regulation may be an important area of treatment focus for individuals with AUD.

Emotion regulation problems are also commonly observed in individuals with PTSD (Seligowski et al., 2015) and are associated with other negative psychological outcomes such as depression, social adjustment, and trauma-related dissociation (Klemanski et al., 2012). Seligowski et al. (2015) conducted a meta-analysis of post-traumatic stress symptoms and emotion regulation and noted large effects for multiple maladaptive emotion regulation strategies (i.e., rumination, thought suppression, experiential avoidance). They found a moderate effect size for expressive suppression and worrying but found no effects for adaptive strategies such as reappraisal or acceptance on PTSD symptoms. However, only 4 out of the 57 studies included in the meta-analysis involved veterans, and only one of those studies exclusively evaluated post-9/11 veterans. Within veterans in general, Boden et al. (2012) found that in the context of high emotional clarity (awareness of one's own emotions), the use of adaptive strategies such as cognitive reappraisal is predictive of reduced PTSD severity. It is possible that cognitive reappraisal may have a direct impact on particular PTSD symptom clusters, such as avoidance or numbing.

Moreover, few studies have explored the relationship between emotion regulation and PTSD within post-9/11 veterans specifically. Pietrzak et al. (2011) explored maladaptive coping strategies (worry, self-punishment, avoidance) among OEF/OIF veterans and found that these domains partially mediated the relationship between post-deployment social support and PTSD symptoms. More recently, in a sample of OEF/OIF/OND veterans, Sippel et al. (2016) compared those veterans with and without PTSD on emotion regulation while controlling for other mood and anxiety disorders. Their study findings suggested that OEF/OIF/OND veterans with PTSD reported more difficulty with emotion regulation in general relative to those without PTSD or a healthy comparison group. They also found a trend for OEF/OIF/OND veterans with PTSD to report greater maladaptive strategies such as expressive suppression, while there were no differences between the groups in their use of adaptive emotion regulation strategies such as cognitive reappraisal (Sippel et al., 2016). However, conclusions of these studies are limited because of their cross-sectional designs, and they also did not assess for alcohol use outcomes.

Given the growing rate of comorbidity of PTSD in post-9/11 veterans with AUD (e.g., Allen et al., 2016; Seal et al., 2011) and the salient impact of emotion regulation strategies on both disorders (e.g., Aldao et al., 2010; Seligowski et al., 2015), additional studies are needed to elucidate how PTSD symptoms and emotion regulation strategies may interact to predict alcohol use in this population in order to inform treatment practices. The present study evaluated the potential impact of both an adaptive and a maladaptive emotion regulation strategy (cognitive reappraisal and expressive suppression, respectively) and PTSD symptoms on one-year alcohol use outcomes in a sample of post-9/11 veterans. Based on the limited prior findings available, we hypothesized that there would be main effects of PTSD symptoms, cognitive reappraisal, and expressive suppression on changes in alcohol use over one year such that higher PTSD symptoms predict higher alcohol use, higher cognitive reappraisal would predict lower alcohol use, and higher expressive suppression would predict higher alcohol use. We also predicted that in the context of high emotional suppression, PTSD symptoms would be associated with an increase in alcohol use, which would implicate maladaptive emotion regulation as a risk factor for drinking in the context of PTSD. Further, we hypothesized that, in the context of low cognitive reappraisal, PTSD symptoms would be associated with an increase in alcohol use, suggesting a need for more adaptive emotion regulation strategies.

2. Material and methods

This study was approved by the Institutional Review Boards at Jesse Brown VA Medical Center as well as University of Illinois-Chicago Medical Center. Research was conducted in accordance with the Helsinki Declaration.

2.1. Participants and procedure

Seventy-one participants were selected from a larger sample of 124 post-9/11 U.S. military veterans who were recruited from Jesse Brown VA Medical Center between 2012 and 2017. The 71 participants selected for longitudinal analysis completed at least two follow-up assessments that occurred in 3-month intervals between the initial screening and a 12-month timepoint. Out of these 71 participants, 22 completed 2 follow-ups, 28 completed 3 follow-ups, and 21 completed 4 follow-ups. Recruitment occurred via advertisements placed in public spaces within the hospital, through clinic referrals, and through outreach to veteran communities. Participants were compensated hourly for their time. Initial exclusion criteria included being over the age of 55, presence of a clinically significant medical or neurological condition that would affect their ability to participate, psychotic disorder, presence of organic mental syndrome, intellectual disability, or pervasive developmental disorder, current substance abuse or suicidal/homicidal