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Rumination Moderates the Associations Between PTSD and
Depressive Symptoms and Risky Behaviors in Veterans

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Abstract

Risky behaviors, including unsafe sex, aggression, rule breaking, self-injury, and dangerous substance use, have become a growing issue for U.S. veterans returning from combat deployments. Evidence in nonveteran samples suggests that risky behaviors may reflect efforts to alleviate depressive and/or anxious symptoms, particularly for individuals with poor emotion regulation skills. These associations have not been studied in veterans. Rumination, or repeated thoughts about negative feelings and events, is a coping strategy associated with several psychopathologies common in the veteran population. In this cross-sectional study, 91 veterans completed measures of trait rumination, self-reported risky behaviors, and symptoms of posttraumatic stress disorder (PTSD) and depression. Analyses revealed that veterans with more depressive and PTSD symptoms reported more risky behaviors. Moreover, rumination significantly interacted with PTSD symptoms ($\beta = .21, p < .05$) and marginally interacted with depressive symptoms ($\beta = .12, p = .06$), such that psychiatric symptoms only predicted risky behaviors for veterans with moderate to high levels of rumination. Although cross-sectional, these findings support theory that individuals with poor coping skills may be particularly likely to respond to negative mood states by engaging in risky behaviors. Implications include using rumination-focused interventions with veterans in order to prevent engagement in risky behaviors.

Rumination Moderates the Associations Between PTSD and Depressive Symptoms and Risky Behaviors in Veterans

Risky behaviors have received recent media attention as a growing issue for U. S. war veterans. Research on individuals following combat deployments to Iraq or Afghanistan found that 47% lose their temper and 15% destroy things in anger (Killgore et al., 2008). Moreover, they engage in risky recreation (25%), self-harm (10%), and illegal drug use (7%) at higher rates than those who have not yet deployed (Thomsen, Stander, McWhorter, Rabenhorst, & Milner, 2011). Furthermore, greater exposure to combat predicts more risk-taking (Killgore et al., 2008). Risky behaviors lead to incarceration, social isolation, and danger to other individuals. Therefore, understanding variables that make veterans more likely to engage in risky behaviors is crucial.

Risky behaviors may arise in part from a desire to avoid or escape aversive emotional states (Cooper, Agocha, & Sheldon, 2000). Thus, individuals may binge on substances, steal, or aggress because the immediate reduction of emotional distress is worth any potential future consequence. In support of this theory, significant associations exist between depressive and anxious symptoms and later risky behaviors (Auerbach, Abela, & Ho, 2007; Auerbach, Claro, Abela, Zhu, & Yao, 2010).

Moreover, risky behaviors may be particularly likely for individuals with poor emotion regulation. These individuals may turn to risky behaviors because they lack more effective coping strategies. Emotion regulation motives in fact predict risky alcohol and sex behaviors (Cooper, Agocha, & Sheldon, 2000). Auerbach and colleagues (2007, 2010) also found correlations between poor emotion regulation skills and greater risky behaviors. Moreover, maladaptive emotion regulation interacted with depressive and anxious symptoms to predict

increases in risky behaviors. These associations have never been studied in a veteran population, for whom risky behaviors may be particularly likely in response to depression and PTSD.

Moreover, identifying specific maladaptive coping strategies might suggest particular targets for clinical interventions.

We propose that rumination, or thinking repeatedly and passively about negative experiences, is a coping strategy that may put depressed or anxious veterans at particular risk for increased risky behaviors. Rumination is linked to the maintenance of both depression and PTSD (Bennett & Wells, 2010; Nolen-Hoeksema, Wisco, Lyubomirsky, 2008). Because rumination involves dwelling on negative experiences, it prolongs and intensifies existing negative emotions. Moreover, it is associated with risky behaviors such as aggression, self-harm, and binge drinking in nonveteran samples (Collins & Bell, 1997; Nolen-Hoeksema, Wisco, Lyubomirsky, 2008). Previous studies found associations between rumination and increased emotional distress in Vietnam and World War II Veterans (Holman & Silver, 1998; Kraaij & Garnefski, 2006). No study, however, has examined whether rumination is associated with risky behaviors among veterans.

In this cross-sectional study, we examined psychiatric symptoms and rumination as factors that may contribute to risky behaviors in a sample of combat veterans seeking treatment at the VA. We hypothesized that greater PTSD and depressive symptoms would be associated with increased risky behaviors and that these associations would be moderated by rumination.

Method

Participants and Procedure

Veterans were recruited from the Department of Veterans Affairs New Jersey War Related Illness and Injury Study Center (NJ WRIISC), a tertiary care specialty clinic that

provides care for veterans with deployment-related health concerns. More than 1,200 veterans participated in comprehensive clinical evaluations at the NJ WRIISC between 2004 and 2010, during which they completed a baseline clinical evaluation. All evaluated at the WRIISC were invited to participate in this follow-up study. Of these, 324 consented and were mailed a follow-up questionnaire packet up to three times (and received two follow-up phone calls); 28% completed the packet. We found no differences in initial PTSD symptoms, age, education, or marital status between those who did and did not complete this survey. Thus, although our response rate was low, we suggest that our current sample was relatively representative of the population from which we sampled. All research was approved by VA New Jersey Healthcare System IRB and appropriate research committees.

Our sample of 91 was 87% male. Their mean age was 37 years ($SD = 11.3$, range = 21 - 66). Over 90% identified as OEF/OIF veterans; the remainder served in a previous conflict. Approximately 39% identified as White, 30% Latino/Latina, 17% Black, 2.5% Asian, 2.5% American Indian, and 9% "Other." The average years of education was 14 ($SD = 2.0$, range = 11 - 18).

Measures

Risky Behaviors. The 20-item Risky Behavior Questionnaire for Adolescents (Auerbach & Abela, 2006) assesses frequency of engagement in unsafe sex, substance use, and aggressive, dangerous, and illegal behaviors in the past month. Response options include *never*, *1 time per month*, *2–4 times per month*, *2–3 times per week*, and *4 times or more per week*. Higher sum scores indicate more risky behavior. This measure correlates strongly with impulsivity and alcohol use, suggesting validity (Auerbach, Abela, Zhu, Yao, 2007). To make the wording appropriate for adults, we changed "boyfriend or girlfriend" to "significant other"

and “skipped class” to “skipped work (or school).” We also omitted 3 items requiring psychiatric follow-up (e.g., cutting yourself). Cronbach’s alpha in this sample was .86. Due to skipped items, four participants did not have complete data for this measure.

Rumination. The 12-item Rumination subscale of the Rumination and Reflection Questionnaire (Trapnell & Campbell, 1999) assesses the tendency to engage in self-focused repetitive thinking about threats or losses (e.g., “Long after an argument is over with, my thoughts keep going back to what had happened”). Participants indicate level of agreement on a 5-point scale from *strongly disagree* to *strongly agree*. Higher sum scores indicate more rumination. This measure correlates highly with measures of brooding, depression rumination, and thinking repeatedly about negative things (Siegle, Moore, & Thase, 2004). Cronbach’s alpha was .94. Three participants lacked complete data for this measure.

PTSD Symptoms. The 17-item National Center for PTSD Checklist (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) assesses the presence and frequency of PTSD symptoms over the past month. Participants respond on a 5-point scale from *not at all* to *extremely*. Higher sum scores indicate more PTSD symptomatology. This measure correlates highly with the Clinician Administered PTSD scale (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Cronbach’s alpha was .97. Two participants lacked complete data for this measure.

Depressive Symptoms. The 8-item Patient Health Questionnaire (Kroenke et al., 2009) assesses the presence and frequency of eight depressive symptoms over the past two weeks, omitting suicidal ideation for research purposes. Participants respond on a 4-point scale from *not at all* to *nearly every day*. Higher sum scores indicate greater depressive symptoms. Substantial research supports the construct validity of this measure as a screening and diagnostic tool (Kroenke et al., 2009). Cronbach’s alpha was .92.

Data Analysis

To investigate the extent that rumination, psychiatric symptoms, and their interaction were related to risky behaviors, we conducted two regression analyses: one with depressive symptoms as a predictor and one with PTSD symptoms. Using the SPSS macro PROCESS (Hayes, 2012), we entered centered main effects of symptoms and rumination and their interaction as a single block of predictors. We probed significant interactions by estimating the conditional effects of symptoms on risky behaviors at the 10th, 25th, 50th, 75th, and 90th percentiles of rumination (Hayes, 2012). Analyses only included participants with complete data on relevant variables. Therefore, the regression analyses had slightly different sample sizes.

Results

Greater rumination significantly correlated with more risky behaviors, PTSD symptoms, and depression symptoms (Table 1). In addition, higher risky behavior correlated with more depressive and PTSD symptoms. Approximately 20% of the sample scored above the cut-off for PTSD, and 38% reported moderately severe or severe depressive symptoms. In the past month, 20% reported being in a physical fight, 28% bullied a peer, 20% had unsafe sex, 26% drove recklessly, 20% destroyed property, 33% verbally harassed someone, and 22% engaged in acts of revenge.

In regression equations, both depressive and PTSD symptoms emerged as significant predictors of risky behaviors (Table 2). The main effect of rumination was significant for depressive symptoms only. The interaction of rumination with PTSD symptoms was significant. Analysis of conditional effects indicated that PTSD symptoms predicted risky behaviors at the 25th, 50th, 75, and 90th percentiles but not at the very low level (10th percentile) of rumination. The interaction of rumination with depressive symptoms revealed a trend towards significance (p

= .06). Specifically, depressive symptoms significantly predicted risky behaviors only at moderate, high, and very high levels of rumination (50th, 75, and 90th percentiles).

Discussion

In line with previous research, veterans with greater depressive and PTSD symptoms reported more risky behaviors. Moreover, the association between PTSD symptoms and risky behavior was moderated by rumination. Specifically, PTSD symptoms predicted risky behaviors for all but very low levels of rumination. Although the interaction between rumination and depressive symptoms was only marginally significant, conditional effects indicated that depressive symptoms predicted risky behaviors for veterans with moderate to high levels of rumination. Clearly, these latter results should be interpreted with caution. Although cross-sectional, these findings are consistent with theory that individuals with poor coping skills may be especially likely to respond to negative moods by engaging in risky behaviors. Future research with veterans should examine these variables longitudinally in order to establish directional associations.

Very few studies have explicitly measured rumination in veterans. Greater rumination was associated with worse psychiatric symptoms and more risky behaviors. Given the high prevalence of depression and PTSD in combat veterans, rumination may be an important risk factor to target in this population. Ruminators show poor executive functioning (Whitmer & Banich, 2007), which is also seen in veterans with traumatic brain injuries (Campbell et al., 2009). Therefore, rumination may exacerbate vulnerabilities that veterans are already experiencing, further increasing the likelihood of risky behaviors. Future studies with this population could also examine whether specific types of rumination (e.g., depressive, anger) relate to particular outcomes.

One important limitation was that we used a measure of risky behaviors created for adolescents, and we omitted three items. Therefore, the measure may have had different psychometric properties from previously reported studies. Given the prevalence of risky behaviors in veterans, future research should validate a measure in this population. Additionally, we sampled veterans who sought treatment at a tertiary care VA clinic and who had a low response rate to this survey. Therefore, our results may not be generalizable to the larger veteran or active duty population. Because of our small sample size and some marginally significant results, replication with larger samples is needed.

The finding that psychiatric symptoms were not related to risky behaviors at low levels of rumination suggests that interventions targeting rumination may help prevent dangerous behaviors. Rumination-focused cognitive behavioral therapy teaches clients alternative coping strategies (e.g., disclosure of emotions, concrete thinking) and effectively decreases symptoms of depression and PTSD (Sezibera et al., 2009). Alternatively, training in mindfulness, or intentional and compassionate attention to the present moment, decreases both rumination and delinquent behavior (Shapiro et al., 2008). Given these promising treatments, mental health providers who work with veterans might consider using rumination-focused interventions to help clients cope with negative affective states and potentially prevent risky behaviors.

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Table 1

Descriptive Statistics and Correlations

Variable	Mean	SD	Range	1.	2.	3.	4.
1. Depressive symptoms	12.43	7.70	0 - 26	--			
2. PTSD symptoms	31.78	19.65	0 - 66	.85	--		
3. Rumination	43.33	10.94	12 - 60	.61	.73	--	
4. Risky behaviors	7.65	8.76	0 - 34	.56	.65	.49	--

Note: SD = Standard Deviation. $N = 91$. $p < .001$ for all correlations.

Table 2

Multiple Regression Analyses for Risky Behaviors Using Depressive and PTSD Symptoms

Separately

Variable	<i>b</i>	<i>SE b</i>	β	<i>t</i>
Depressive symptoms				
Depressive symptoms	.42	.13	.38	3.14**
Rumination	.26	.10	.31	2.49*
Depression x Rumination interaction	.02	.01	.21	2.01*
Overall model: adjusted $R^2 = .37$, $F(3, 70) = 15.50^{***}$				
PTSD symptoms				
PTSD symptoms	.26	.05	.59	4.89***
Rumination	.13	.11	.17	1.21
PTSD x Rumination interaction	.01	.003	.21	2.21*
Overall model: adjusted $R^2 = .45$, $F(3, 78) = 23.16^{***}$				

Note: *b* = unstandardized regression coefficients, *SE b* = standard error of *b*, β = standardized regression coefficients. *N* for depressive symptoms analyses = 74. *N* for PTSD symptoms analyses = 82.

* $p < .05$, ** $p < .01$, *** $p < .001$.