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## Examining the Interaction Between Potentially Morally Injurious Events and Religiosity in Relation to Alcohol Misuse Among Military Veterans

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### Abstract

Given the disproportionate rate of alcohol misuse among veterans and related outcomes as compared to the general population, the examination of predictors of alcohol misuse in this population is imperative. Potentially morally injurious events (PMIEs), defined as severe transgressions of a moral code, have been positively associated with alcohol misuse. Exposure to PMIEs may challenge one's religious beliefs, which may, in turn, influence the strength of the association between PMIEs and alcohol misuse among military veterans. The goal of the current study was to examine the potential moderating role of religiosity in the association between PMIEs and alcohol misuse (i.e., alcohol consumption, drinking behaviors, adverse reactions to drinking, and alcohol-related problems). Participants were 496 military veterans in the community ( $M_{\text{age}} = 37.80$  years,  $SD = 11.42$ ; 70.5% male). The results of moderation analyses indicated that overall religiosity, organizational religiosity, and intrinsic religiosity significantly moderated the association between PMIEs and alcohol misuse such that the positive relation between PMIEs and alcohol misuse was stronger at high versus low levels of religiosity,  $R^2\text{'s} = .01$ . Our findings highlight the importance of considering the role of religiosity in relation to alcohol misuse as a moral injury outcome and the potential utility of tailoring treatments for military veterans who have experienced moral injury.

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Alcohol misuse is a major concern among military veterans, with estimates of alcohol misuse ranging from 12% to 40% (Burnett-Zeigler et al., 2011; Calhoun et al., 2008; Hoge et al., 2004; Milliken et al., 2007; Wilk et al., 2010). Military veterans are more likely to meet the criteria for a lifetime (42.2%) or past-year (14.8%) alcohol use disorder (Fuehrlein et al., 2016) than individuals in the general population (29.1% and 13.9%, respectively; Grant et al., 2015), and alcohol misuse among military veterans is associated with a wide range of comorbid psychiatric and behavioral health concerns, such as mood disorders and suicide attempts (Fuehrlein et al., 2016). Further, despite the demonstrated disproportionate impact of alcohol misuse on military populations, the vast majority of military veterans

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Open Practices Statement

The study reported in this article was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials should be sent via email to the lead author at edt29@uri.edu.

report that they have not received treatment for alcohol misuse (Burnett-Zeigler et al., 2011; Calhoun et al., 2008). To further inform etiological and treatment models of alcohol misuse among military veterans, the examination of predictors of alcohol misuse in this population is imperative.

One important predictor worth exploring is potentially morally injurious events (PMIEs), which are experiences characterized by either the perceived betrayal of “what’s right” by a trusted authority member (Shay, 2014) or one’s own transgression regarding important moral standards or expectations (i.e., committing, observing, or failing to prevent acts of violence deemed inappropriate or disproportionate, accidental, or within a chain of command; Drescher et al., 2011; Litz et al., 2009). These experiences are purported to undermine fundamental assumptions of benevolence and trustworthiness of oneself and the world, leading to enduring psychological, spiritual, and social harm, termed moral injury (Litz et al., 2009). According to Litz et al. (2009), PMIEs can lead to collateral manifestations, such as self-harming behaviors. According to the working causal framework for moral injury, alcohol misuse is one of many self-harming behaviors that may develop secondary to self-condemnation and failure to forgive oneself (Litz et al., 2009). Conceptually, the strong emotional reactions associated with perceived moral failings (e.g., shame, guilt) may lead to maladaptive coping strategies, such as alcohol misuse (see the model of dynamics involved in moral injury by Koenig et al., 2018). This proposed relation between PMIEs and alcohol misuse is consistent with the self-medication (Khantzian, 1997) and negative reinforcement (Baker et al., 2004) models of alcohol use, which suggest that alcohol use functions to suppress aversive experiential states. Indeed, preliminary findings have suggested that PMIEs are associated with an increased risk for alcohol misuse (Battles et al., 2018, 2019).

Despite some initial evidence linking PMIEs and alcohol misuse among military veterans, limited studies have explored factors that may influence this association. The identification of moderators is imperative to identifying military veterans who may be most at risk for alcohol misuse following PMIE exposure. Religiosity may be one factor that plays an important role in impacting the strength of the relation between PMIEs and alcohol use. Religiosity refers to the participation in public religious activities (i.e., organizational religiosity [OR]), private religious activities (i.e., nonorganizational religiosity [NOR]), and personal commitment or motivation to religious faith (i.e., intrinsic religiosity [IR]; Koenig & Büssing, 2010). Religiosity has been largely found to confer protection against alcohol misuse among military veterans (Sharma et al., 2017). It may buffer against alcohol misuse by promoting the use of alternative forms of coping, such as prayer, that are incongruent with alcohol misuse (Wachholtz & Sambamoorthi, 2011). Community norms may also play an integral role in discouraging alcohol use, as religious communities tend to promote abstinence from alcohol consumption (Ford & Kadushin, 2002). However, there is limited understanding of the ways in which PMIEs and religiosity interact to predict alcohol misuse in military veteran samples. In contrast to the previously discussed findings, religiosity may serve as a risk factor in the context of PMIEs. Specifically, PMIEs may prompt spiritual and/or existential crises among religious military veterans, leading them to question their religious or spiritual beliefs (Flipse Vargas et al., 2013). Moreover, PMIEs may lead to spiritual injury, such as feelings of guilt, grief, lack of meaning, doubt, anger toward a

higher power (Berg, 2011). In turn, military veterans may misuse alcohol in an attempt to cope with these spiritual crises or injuries (Battles et al., 2019; Litz et al., 2009); however, existing research has yet to investigate the role of different components of religiosity and their interactions with PMIEs with regard to alcohol misuse.

Addressing important gaps in the existing literature, the goal of the current study was to explore the associations among PMIEs, religiosity, and alcohol misuse within a sample of military veterans in the community. In particular, we examined the potential moderating roles of overall religiosity, OR, NOR, and IR in the association between PMIEs and alcohol misuse. We expected that PMIEs would be significantly positively associated with alcohol misuse. Further, we hypothesized that religiosity (i.e., overall, OR, NOR, and IR) would moderate this relation, such that PMIEs would only be significantly positively related to alcohol misuse at high, but not low, levels of religiosity. We expected a similar pattern of findings for OR, NOR, and IR given evidence that they have demonstrated similar relations with health outcomes (Cotton et al., 2006).

## Method

### Participants and Procedure

We recruited military veterans using Amazon's Mechanical Turk (MTurk), an internet-based crowdsourcing platform. Previous research has demonstrated that MTurk is capable of generating reliable data (Buhrmester et al., 2011; Shapiro et al., 2013) and represents the general population in terms of demographic characteristics (Mishra & Carleton, 2017) and prevalence of mental health problems (Shapiro et al., 2013). Users of MTurk with an approval rating higher than 95% were able to access the study. Participants were screened for four inclusionary criteria: (a) at least 18 years of age, (b) living in North America, (c) working knowledge of the English language, and (d) a veteran of the United States military; participants were warned that impersonating a military veteran for financial gain is illegal. Participants who met the eligibility criteria provided informed consent and completed the survey on Qualtrics (Provo, UT). To improve data quality, consistent with Meade and Craig's (2012) recommendation of incorporating one validity check per 50–100 items, four validity checks were incorporated to assess attentive responding and comprehension (e.g., "I have never brushed my teeth;" Aust et al., 2013; Meade & Craig, 2012; Oppenheimer et al., 2009; K. A. Thomas & Clifford, 2017). Further, two military-specific questions that have been previously used in research to differentiate military and civilian samples were also asked: "What is the acronym for the generic term that the military uses for various job fields?" and "What is the acronym for the locations where final physicals are taken prior to shipping off for basic training?" (Lynn & Morgan, 2016). To ensure the quality of the data, participants who failed to correctly respond to any of the six validity checks were excluded. Participants were compensated \$2.50 (USD) for study participation. All procedures were approved by the Institutional Review Board at the University of Rhode Island.

Of the 2,644 responses obtained, 997 participants were excluded because they did not meet one or more of the inclusionary criteria ( $n = 1,647$ ). We then excluded 899 participants who failed to pass any of the four validity questions, 134 participants who failed to pass either of the two military-specific validity questions, 79 participants who attempted to complete

the survey more than once, and 39 participants who completed the survey in less than 50% of the median completion time. Missing item-level data ranged from 15 to 24 participants missing between one and 12 items on the Moral Injury Events Scale (MIES), seven to 20 participants missing between one and five items on the Duke Religiosity Index (DUREL), and three to 12 participants missing between one and 10 items on the Alcohol Use Disorders Identification Test (AUDIT). Missing values were imputed using the multiple imputation procedure in SPSS. The final sample for the present study included 496 participants, most of whom were male (70.5%). The average participant age was 37.80 years ( $SD = 11.42$ ). Most (63.7%) participants were affiliated with the U.S. Army, 9.9% were affiliated with the Navy, 19.0% with the Air Force, 6.3% with the Marines, and 1.2% with the Coast Guard. Regarding race, participants identified as White (71.1%), Black (22.0%), Asian (4.2%), American Indian/Alaska Native (3.6%), and Native Hawaiian/Other Pacific (1.0%). In addition, 22.9% reported Hispanic ethnicity. For religion, 93.4% identified as Christian, 1.9% as Jewish, 1.5% as Buddhist, 1.0% as Muslim, 0.8% as Hindu, and 1.0% as other.

## Measures

**Potentially Morally Injurious Events**—The MIES (Nash et al., 2013) is a nine-item self-report scale that is used to measure exposure to PMIEs. The MIES includes items related to perceived transgressions committed by one's self (e.g., "I am troubled by having acted in ways that violated my own morals or values"), perceived transgressions committed by others (e.g., "I am troubled by having witnessed others' immoral acts"), and acts of betrayal (e.g., "I feel betrayed by fellow service members whom I once trusted"). Participant responses are captured on a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*), with possible scores ranging from 9 to 54. Scores were summed to create a total scale score, with higher scores indicating a higher level of PMIE exposure. The scale is generally considered to be reliable and valid for use with military veterans and has demonstrated good internal consistency and convergent validity (Bryan et al., 2016; Nash et al., 2013). In the present sample, the internal consistency was excellent, Cronbach's  $\alpha = .95$ .

**Religiosity**—The DUREL (Koenig & Büssing, 2010) is a five-item, self-report measure that captures responses related to OR (e.g., "How often do you attend church or other religious meetings?"), NOR (e.g., "How often do you spend time in private religious activities, such as prayer, meditation or bible study?"), and IR (e.g., "In my life, I experience the presence of the Divine"). Participants rated one item each regarding OR and NOR on a 6-point scale ranging from 1 (*never*) to 6 (*more than once per week*) and three items measuring IR on a 6-point scale ranging from 1 (*definitely not true*) to 6 (*definitely true of me*). Possible scores range from 5 to 30. Scores were summed to create total and subscale scores, with higher scores indicating higher degrees of religiosity. The DUREL has demonstrated good test-retest reliability and convergent validity among veteran populations (Koenig & Büssing, 2010; K. H. Thomas et al., 2018). In the present study, Cronbach's alpha for the total and IR scales were .94 and .93, respectively.

**Alcohol Misuse**—The AUDIT (Saunders et al., 1993) is a 10-item self-report measure that is used to assess alcohol consumption, drinking behaviors, adverse reactions to drinking, and alcohol-related problems (e.g., "How often do you have six or more drinks on one

occasion?"). Participants were asked to rate items on a 5-point scale ranging from 0 (*never*) to 4 (*daily or almost daily*), with possible total scores ranging from 0 to 40. Scores were summed to create a total scale score, with higher scores representing higher levels of alcohol misuse. The AUDIT has demonstrated good test–retest reliability, convergent and criterion validity, and internal consistency among veterans (Searle et al., 2015). In the present sample, the internal reliability was excellent, Cronbach's  $\alpha = .92$ .

## Data Analysis

We first calculated descriptive data and correlations. To address the question of whether PMIEs, religiosity, and their interaction were related to alcohol misuse, analyses were conducted using the PROCESS macro in SPSS (Hayes, 2016). First, PMIEs and religiosity were mean-centered. Then, PMIEs, religiosity, and the PMIES x Religiosity interaction were entered into the model. Four separate models explored total religiosity, OR, NOR, and IR. Significant interactions were probed following the methods described by Aiken and West (1991). Regression lines were plotted 1 standard deviation above and below the mean religiosity score. We then conducted follow-up tests to examine whether the slopes of the regression lines differed significantly from 0. Consistent with Cohen (1988), effects of .10 or less were considered small, effects .30 and below were considered small-to-medium, those .50 and below were considered medium-to-large, and those greater than .50 were considered large-to-very large.

## Results

### Preliminary Analyses

Descriptive statistics and correlations are presented in Table 1. As shown, PMIEs were positively correlated with alcohol misuse,  $r = .48, p < .001$ , as well as total religiosity,  $r = .10, p = .030$ , and OR,  $r = .18, p < .001$ . Alcohol misuse was correlated with total religiosity,  $r = .09, p = .049$ , and OR,  $r = .17, p < .001$ . We found that NOR and IR were not significantly correlated with PMIEs, NOR:  $r = .07, p = .151$ , IR:  $r = .07, p = .109$ , or alcohol misuse, NOR:  $r = .05, p = .262$ , IR:  $r = .07, p = .143$ .

### Primary Analysis

A summary of the moderation analyses is presented in Table 2. In the first model, the interaction between PMIEs and total religiosity was significant,  $b = 0.01, SE = 0.04, t(492) = 2.19, p = .029, 95\% CI [0.001, 0.02], R^2 = .01$ , with a stronger positive relation between PMIEs and alcohol misuse at high,  $b = 0.43, p < .001$ , versus low,  $b = 0.30, p < .001$ , levels of total religiosity. In the second model, the interaction between PMIEs and OR was significant,  $b = 0.05, SE = 0.02, t(492) = 2.98, p = .003, 95\% CI [0.02, 0.09], R^2 = .01$ , with a stronger positive relation between PMIEs and alcohol misuse at high,  $b = 0.45, p < .001$ , versus low,  $b = 0.27, p < .001$ , levels of OR. In the third model, the interaction between PMIEs and NOR was not significant,  $b = 0.01, SE = 0.02, t(492) = 0.81, p = .419, 95\% CI [-0.02, 0.04]$ . In the fourth model, the interaction between PMIEs and IR was significant,  $b = 0.01, SE = 0.01, t(492) = 2.10, p = .036, 95\% CI [0.001, 0.02], R^2 = .01$ , such that there was a stronger positive relation between PMIEs and alcohol misuse at high,  $b = 0.43, p < .001$ , versus low,  $b = 0.30, p < .001$ , levels of IR. Of note, for all moderation analyses,

there were no statistically significant transition points within the observed ranges of the moderators found using the Johnson–Neyman method.

## Discussion

The goal of the present study was to examine the potential moderating role of religiosity in the association between PMIEs and alcohol misuse. Counter to most previous research, we found that religiosity was weakly and positively associated with alcohol misuse. There is some previous evidence that religiosity is linked to alcohol use but not misuse (Burris et al., 2011; Patock-Peckham et al., 1998). The present findings suggest that alcohol misuse may be more driven by negative affectivity (e.g., self-medication) than other factors (e.g., religion). The results of the regression analyses were mostly consistent with our hypotheses, as PMIEs and alcohol misuse were found to be more strongly positively associated at high versus low levels of total religiosity, OR, and IR. These results indicate that military veterans in the community who have been exposed to PMIEs and report having higher degrees of total religiosity, OR, and IR may have a higher risk of alcohol misuse.

Our findings add to the literature regarding religiosity and alcohol misuse in the context of PMIEs. We found that the strength of the association between PMIEs and alcohol misuse was stronger at higher versus lower levels of religiosity. There are several explanations for these findings. First, PMIEs can contribute to feelings of guilt and shame (Litz et al., 2009), and these aversive experiential states may prompt military veterans to find ways to cope with the emotional stress induced by the event (Dombo et al., 2013), such as alcohol use (Nieuwsma et al., 2015). Consistent with the self-medication hypothesis (Khantzian, 1997), individuals may use alcohol to dampen negative emotions associated with morally injurious experiences. The association between PMIEs and alcohol misuse may be stronger among individuals with higher levels of IR because, after a PMIE takes place, the dissonance that occurs between their religious beliefs and method of coping (i.e., alcohol misuse) may lead them to question their faith. Alternatively, this incongruence may lead military veterans with a history of PMIE exposure who misuse alcohol to experience more distress and, thus, seek more religious meetings than those with lower ratings of OR. Therefore, in these cases, the link between PMIEs and alcohol misuse would be stronger due to increased PMIEs. In addition, among individuals with high levels of religiosity, PMIEs may prompt spiritual or existential crises, leading to spiritual injury and resulting in negative feelings of guilt or anger toward a higher power; this may place military veterans at a higher risk for misusing alcohol as a means of coping with those feelings. Unexpectedly, NOR did not influence the association between PMIEs to alcohol misuse. It may be that this facet of religiosity may be perceived as more ritualistic than the other two components and perhaps requires less direct confrontation of perceived moral transgressions; further research is needed to test this premise.

Although preliminary, if replicated, the present results may have relevant clinical implications. Among military veterans who endorse a religious orientation, the assessment of OR and IR may be helpful in identifying treatment targets to reduce the risk for alcohol misuse following PMIEs (e.g., guilt cognitions). Adaptive disclosure (Litz et al., 2017), impact of killing (Maguen et al., 2017), and acceptance and commitment therapy



(Borges, 2019) are treatments aimed at alleviating the severity of moral injury outcomes. Although each treatment approaches moral injury differently, whether via corrective feedback, cognitive restructuring, or acceptance, highly religious veterans may require slightly different treatment tailoring than those who are less religious given that one's sense of morality is often uniquely intertwined with their religious orientation.

Although the results of the current study advance the field's understanding of the associations among PMIEs, religiosity, and alcohol misuse, study limitations must be considered. First, though multiple steps were taken to ensure the data quality, data collection via the internet (e.g., MTurk) may include sample biases because of self-selection (Kraut et al., 2004); limited control over the research environment (Kraut et al., 2004); and deception, such as attempting to take the survey multiple times or faking eligibility (Hauser et al., 2019). Similarly, participants needed to be computer literate and have a working knowledge of MTurk. Second, the data were cross-sectional, and conclusions are thus limited to correlational explanations. It is possible that the relations we examined were bidirectional (e.g., military veterans who misuse alcohol may have been susceptible to or more likely report PMIEs). Third, the sample comprised mostly Christians and assessed circumscribed aspects of religiosity. Research is needed to examine the extent to which the present findings generalize to other aspects of religiosity and to populations that self-identify as non-Christians (e.g., Muslim). Fourth, the interaction effect sizes were small. Studies are needed to explicate the clinical meaning and utility of the findings. Investigations in clinical samples (e.g., veterans with alcohol use disorders) may be more robust. Given that most participants self-identified as Christian, response variation on the measures of religiosity may have been limited, possibly resulting in smaller interaction effect sizes. Finally, our sample was composed of military veterans in the community, and findings cannot be assumed to generalize to other military or civilian populations.

Despite these limitations, the present study improves the field's understanding of the association between PMIEs and alcohol misuse in military veterans. The findings replicate the previously identified positive relation between PMIEs and alcohol misuse (Battles et al., 2018, 2019; Litz et al., 2009). Extending this work, our results suggest that military veterans who have experienced PMIEs and report higher versus lower levels of religiosity are more likely to misuse alcohol. Future studies are needed to identify the specific mechanisms through which religiosity influences the strength of the association between PMIE exposure and alcohol misuse.

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Descriptive Data and Correlations for Potentially Morally Injurious Events (PMIEs), Religiosity, and Alcohol Misuse

Table 1

	1	2	3	4	5	6	M (SD)	Range
1. PMIEs	-	.10*	.18**	.07	.07	.48**	28.70	12.63 9-54
2. Total religiosity	-	-	.83**	.88**	.97**	.09*	14.75	8.40 5-30
3. Organizational religiosity	-	-	-	.73**	.72**	.17**	2.70	1.65 1-6
4. Nonorganizational religiosity	-	-	-	-	.77**	.05	2.94	1.91 1-6
5. Intrinsic religiosity	-	-	-	-	-	.07	9.12	5.51 3-18
6. Alcohol misuse	-	-	-	-	-	-	9.32	9.70 0-37

\*  $p < .05$ .

\*\*  $p < .01$ .

**Table 2**

Results of Moderation Analyses

Study Variables	R <sup>2</sup>	R <sup>2</sup>	MSE	F	df	B	SE	t(492)	95% CI
Model 1: Total religiosity	.24**		71.59	52.85	3, 492				
PMIEs						0.37**	0.03	12.07**	[0.31, 0.43]
Total religiosity						0.05	0.05	1.19	[-0.04, 0.14]
PMIEs x Total Religiosity		.01*		4.78	1, 492	0.01*	0.04	2.19*	[0.001, 0.02]
Model 2: Organizational religiosity	.26**		70.46	56.34	3, 492				
PMIEs						0.36**	0.03	11.75**	[0.30, 0.42]
Organizational religiosity						0.45*	0.23	1.95*	[-0.004, 0.91]
PMIEs x Organizational Religiosity		.01**		8.88	1, 492	0.05**	0.02	2.98**	[0.02, 0.09]
Model 3: Nonorganizational religiosity	.24**		72.32	50.57	3, 492				
PMIEs						0.37**	0.03	12.20**	[0.31, 0.43]
Nonorganizational religiosity						0.11	0.20	0.54	[-0.29, 0.50]
PMIEs x Nonorganizational Religiosity		.001		0.65	1, 492	0.01	0.02	0.81	[-0.02, 0.04]
Model 4: Intrinsic religiosity	.24**		71.72	52.48	3, 492				
PMIEs						0.37**	0.03	12.14**	[0.31, 0.43]
Intrinsic religiosity						0.07	0.07	1.00	[-0.07, 0.21]
PMIEs x Intrinsic Religiosity		.01*		4.42	1, 492	0.01*	0.01	2.10*	[0.001, 0.02]

Note. PMIEs = potentially morally injurious events.

\*  $p < .05$ .

\*\*  $p < .01$ .