POSTTRAUMATIC STRESS, ALCOHOL USE, AND ALCOHOL USE MOTIVES

AMONG FIREFIGHTERS: THE ROLE OF DISTRESS TOLERANCE

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A Thesis

Presented to

The Faculty of the Department

of Psychology

University of Houston

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In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

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By

Maya Zegel

August 2019

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Abstract

Firefighters represent a unique, vulnerable population at high risk for alcohol use disorder (AUD) and posttraumatic stress disorder (PTSD) symptomatology due to the high rates of occupational exposure to traumatic events. To inform specialized alcohol use interventions for firefighters, it is important to understand relevant malleable cognitive-affective factors related to PTSD and AUD symptoms. Distress tolerance (DT), defined as the perceived ability to withstand negative emotional states, is one promising factor relevant to this domain. The current study aimed to examine the moderating role of DT in the association of PTSD symptom severity with alcohol use severity and motives. It is hypothesized that, among firefighters with higher levels of PTSD symptoms, lower levels of DT will be related to more severe alcohol use and greater coping-oriented alcohol use motives but no other use motives. Participants included 652 trauma-exposed firefighters (93.3% male; $M_{age} = 38.7$ years, SD = 8.6) who endorsed lifetime (ever) alcohol use. A series of regression analyses was conducted using PROCESS v3.1 for IBM SPSS version 25.0. Covariates included romantic relationship status, number of years in the fire service, occupational stress, and trauma load (i.e., number of traumatic event types). For analyses examining alcohol use motives, alcohol consumption was included as an additional covariate. The interactive effect of PTSD symptom severity and DT was significantly associated with coping-oriented alcohol use motives ($R^2 = .023$, $B = -.001$, $p<.001$) but no other alcohol-related outcomes. This is the first study to concurrently examine these variables among firefighters. This line of inquiry will have great potential to inform intervention efforts for this vulnerable, understudied population.

Keywords: firefighters, distress tolerance, alcohol, coping, motives

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Introduction

Disproportionately higher rates of alcohol use and related disorders have been documented among firefighters compared to the general population (Carey, Al-Zaiti, Dean, Sessanna, & Finnell, 2011; Grant et al., 2015; Haddock, Day, Poston, Jahnke, & Jitnarin, 2015; Haddock et al., 2012; Meyer et al., 2012; Smith, Gallagher, Tran, & Vujanovic, 2018; Tomaka, Magoc, Morales-Monks, & Reyes, 2017). For example, the prevalence of alcohol use disorder (AUD) among firefighters is estimated to be approximately 50% (Carey et al., 2011; Haddock et al., 2015), compared to less than 30% among the general population (Grant et al., 2015). Additionally, about half of firefighters report excessive drinking (e.g. an average of 3 or more drinks per sitting), and of those reporting excessive drinking, nearly three-fourths report multiple episodes of excessive drinking within the past month (Haddock et al., 2015). An emergent literature suggests that firefighters report consuming alcohol in an effort to cope with negative emotional states (Bacharach, Bamberger, & Doveh, 2008; North et al., 2002; Tomaka et al., 2017). Coping-oriented alcohol use among firefighters has been associated with more severe alcohol use (Meyer et al., 2012; Smith, Gallagher, et al., 2018; Tomaka et al., 2017) and greater levels of work-related stress (Bacharach et al., 2008). Firefighters experience unique, job-related stressors (e.g. exposure to potentially traumatic events and atypical work hours) which may influence drinking patterns and other mental health outcomes (e.g., posttraumatic stress disorder [PTSD]; Haddock et al., 2012; Jones, 2017).

Indeed, firefighters are at significantly elevated risk for exposure to traumatic events and PTSD, both significant risk and maintenance factors for AUD. PTSD provides an important avenue for better understanding alcohol use and alcohol use motives among

firefighters. Trauma exposure among firefighters has been estimated to be 91.5%, with nearly one-third reporting three or more lifetime traumatic events (Meyer et al., 2012). However, the reported prevalence of PTSD in the literature varies greatly among firefighters (North et al., 2002). For example, a recent study estimated that 32.4% of firefighters met diagnostic criteria for PTSD, as measured by the PTSD Checklist-Civilian Version (Tomaka et al., 2017), a proportion substantially greater than the 8.3% lifetime prevalence of PTSD among the general population (Kilpatrick et al., 2013). However, prevalence estimates for PTSD among firefighters range from approximately 9% (Meyer et al., 2012; Smith, Gallagher, et al., 2018) to nearly 33% (Tomaka et al., 2017) based on self-report measures.

Greater PTSD symptomatology has been correlated with increased at-risk drinking and greater alcohol-related problems among firefighters (Tomaka et al., 2017). Further research has shown that PTSD symptoms can predict quantity of alcohol use among firefighters, such that those with greater PTSD symptomatology consume a greater number of alcoholic drinks per week (Gulliver et al., 2018); this relationship remains significant controlling for trauma exposure and depression symptoms, which demonstrates the unique effect of PTSD on alcohol use. Additionally, PTSD symptom severity among firefighters has been associated with coping motives for alcohol use (Meyer et al., 2012; Smith, Gallagher, et al., 2018; Tomaka et al., 2017). Recent findings demonstrate that coping-oriented alcohol use mediates the relationship between PTSD symptoms and problematic alcohol use (Tomaka et al., 2017). Given the high prevalence of both PTSD symptoms and alcohol use among firefighters, it is important to advance

understanding of factors underlying this comorbidity so as to inform specialized, evidence-based intervention efforts.

Distress tolerance (DT), or the ability to withstand negative physical or emotional states (Leyro, Zvolensky, & Bernstein, 2010), is one such transdiagnostic factor with clinical relevance to both PTSD symptoms and alcohol use. Distress tolerance has been negatively (inversely) associated with PTSD symptom severity among samples of adults exposed to various potentially traumatic events, including firefighters (Banducci, Connolly, Vujanovic, Alvarez, & Bonn-Miller, 2017; Bartlett et al., 2018; Fergus & Bardeen, 2016; Gerber et al., 2018; Hashoul-Andary et al., 2016; Marshall-Berenz, Vujanovic, Bon-Miller, Bernstein, & Zvolensky, 2010; Vujanovic, Bonn-Miller, Potter, Marshall, & Zvolensky, 2011; Vujanovic, Dutcher, & Berenz, 2017). Among individuals with PTSD, preliminary research has demonstrated that increases in distress tolerance are related to improvements in PTSD symptomatology during the course of treatment (Banducci et al., 2017). Research has also demonstrated that distress tolerance is negatively correlated with alcohol use, alcohol use coping motives, and positive alcohol expectancies across populations (Duranceau, Fetzner, & Carleton, 2014; Himmerich & Orcutt, 2019; Holliday, Pedersen, & Leventhal, 2016; Marshall-Berenz, Vujanovic, & Macpherson, 2011; Vujanovic, Marshall-Berenz, & Zvolensky, 2011).

Across various populations, distress tolerance has demonstrated an influence on the association between PTSD and alcohol use as well as coping-motivated alcohol use (Duranceau et al., 2014; Haller & Chassin, 2014; Marshall-Berenz et al., 2011; Vinci, Mota, Berenz, & Connolly, 2016; Vujanovic, Marshall-Berenz, et al., 2011). Within trauma-exposed samples, lower distress tolerance has been associated with increased

alcohol use (Duranceau et al., 2014; Haller & Chassin, 2014; Vinci et al., 2016). Distress tolerance has also been shown to significantly mediate the effect of PTSD symptoms on alcohol use severity (Duranceau et al., 2014; Holliday et al., 2016) and alcohol-related coping motives (Marshall-Berenz et al., 2011; Vujanovic, Marshall-Berenz, et al., 2011). Notably, the mediational studies to date have been limited by cross-sectional designs, precluding our ability to interpret temporal order of effects (Duranceau et al., 2014; Holliday et al., 2016; Marshall-Berenz et al., 2011; Vujanovic, Marshall-Berenz, et al., 2011). Furthermore, distress tolerance, among trauma-exposed undergraduate students, has been found to mediate the indirect effect of PTSD symptoms on alcohol use via positive alcohol-related expectancies relevant to negative alterations in cognition and mood (Himmerich & Orcutt, 2019). This effect was strengthened for those with higher distress tolerance, suggesting that those with a greater perceived capacity to tolerate negative emotional states may be more likely to view alcohol as reinforcing for reducing negative thoughts and emotions. This finding contradicts the results observed in prior work, underscoring the need for more empirical investigation of the role of distress tolerance in associations between PTSD and alcohol use. Thus, the literature to date is nascent and mixed with regard to whether distress tolerance may mediate or moderate associations between PTSD symptomatology and alcohol use or alcohol use coping motives, as well as the direction of said relationship. No studies have examined these associations among first responders, generally, or firefighters, specifically.

Taken together, among firefighters with PTSD, it is theorized that those with low levels of distress tolerance may have an even greater risk of using alcohol to cope when confronted with trauma-related cues or PTSD symptoms, as these experiences may be

especially distressing for a firefighter with a lower perceived ability or actual capacity to tolerate distress (Haller & Chassin, 2014; Meyer et al., 2012; Smith, Gallagher, et al., 2018; Tomaka et al., 2017). Thus, firefighters experiencing PTSD symptomatology may be more likely to consume alcohol and to do so as a maladaptive way to cope with negative emotions (Bacharach et al., 2008). A lower perceived ability to tolerate negative emotions may therefore exacerbate the established association between PTSD symptom severity and a) greater alcohol use and b) greater coping-oriented alcohol use among firefighters (Duranceau et al., 2014; Haller & Chassin, 2014; Himmerich & Orcutt, 2019; Holliday et al., 2016; Marshall-Berenz et al., 2011; Vinci et al., 2016; Vujanovic, Marshall-Berenz, et al., 2011). This model is consistent with the self-medication model of PTSD/AUD comorbidity (e.g., Erwin et al., 2018; Haller & Chassin, 2014; Homish, Hoopsick, Heavey, Homish, & Cornelius, 2019; Khantzian, 1997; Sheerin et al., 2016; Stewart, Pihl, Conrod, & Dongier, 1998; Ullman, Filipas, Townshend, & Starzynski, 2005), which posits that alcohol use may be used to manage (i.e., decrease), albeit acutely, PTSD symptoms. This line of work has great potential to inform specialized, evidence-based interventions for PTSD and alcohol misuse among firefighters (Haller & Chassin, 2014; Meyer et al., 2012; Smith, Gallagher, et al., 2018; Tomaka et al., 2017).

Several gaps have been noted in the extant empirical literature. First, we are aware of only three studies that have examined distress tolerance among firefighters, broadly (Bartlett et al., 2018; Smith, Bartlett, et al., 2018; Stanley et al., 2018). This is unfortunate since distress tolerance presents a malleable cognitive-affective factor with potential to inform novel interventions for firefighters with a wide range of mental health disturbances. Second, only six published studies to date have examined moderating or

mediating factors in the association between PTSD and alcohol use in firefighters

(Arbona, Fan, & Noor, 2016; Gulliver et al., 2018; Martin et al., 2017; Smith et al., 2011;

Smith, Gallagher, et al., 2018; Tomaka et al., 2017). More such work is necessary in

order to better understand PTSD/AUD associations in this vulnerable population. Finally,

no studies to date have examined the role of distress tolerance in the association between

PTSD symptomatology and alcohol use or alcohol use motives in firefighters.

Therefore, the current study aimed to examine associations between PTSD

symptoms, distress tolerance, and alcohol use severity as well as alcohol use motives (i.e.

coping, enhancement, conformity, and social) among firefighters. First, we hypothesized

that firefighters with greater PTSD symptom severity would report greater alcohol use

and alcohol use coping motives. Second, we hypothesized that those with lower levels of

perceived distress tolerance would report greater alcohol use and alcohol use coping

motives. Finally, we hypothesized that perceived distress tolerance would exacerbate, or

moderate, the association of PTSD symptom severity with alcohol use severity and

alcohol use coping motives. That is, we expected the strongest relationship between

elevated PTSD symptoms and greater alcohol use and alcohol use coping motives to be

observed among firefighters with low levels of perceived distress tolerance. Firefighters

with greater PTSD symptomatology and low perceived distress tolerance were expected

to report the highest levels of alcohol use severity and coping-oriented alcohol use.

Consistent with past literature (Bacharach et al., 2008; Smith, Gallagher, et al., 2018), no

significant effects were expected for alcohol use motives other than coping motives (i.e.,

enhancement, conformity, social). All associations were expected above and beyond

theoretically-relevant covariates, including romantic relationship status, years of service

in the fire department, occupational stress, and trauma load (i.e., total number of traumatic event types experienced), which were selected due to significant associations with alcohol use and motives in prior research among firefighters (Meyer et al., 2012; Piazza-Gardner et al., 2014; Smith, Bartlett, et al., 2018; Stanley et al., 2018). To control for the effect of alcohol use severity on use motives, alcohol consumption was included as a covariate for all analyses examining motives.

Method

Participants

This study is a secondary analysis of data from a larger project examining stress and health-related behaviors among firefighters. This sample included 652 professional firefighters (93.3% male; $M_{age} = 38.7$, $SD = 8.6$) from a fire department in a large metropolitan area in the southern U.S. Please see Table 1 for a summary of the sociodemographic characteristics for this sample. All firefighters in this department provide Emergency Medical Services (EMS) in addition to fire suppression. Study inclusion criteria required participants to be over 18 years of age, be current firefighters, and have consented to completion of all online questionnaires. Exclusionary criteria included inability or unwillingness to consent to complete the online questionnaires. A total of 1,239 of 4,000 firefighters in the department consented to participation and completed all measures. For purposes of this secondary analysis, participants must have experienced at least one PTSD Criterion A traumatic life event (American Psychiatric Association, 2013) and endorsed lifetime alcohol consumption ($n = 652$).

Measures

Demographic questionnaire. Participants were asked to self-report demographic information including sociodemographic characteristics and firefighter service history. Romantic relationship status and number of years in the fire service were used as covariates in the present analyses.

Sources of Occupational Stress - 14 (SOOS-14; Kimbrel et al., 2011). The SOOS-14 is an abbreviated version of the Sources of Occupational Stress Scale (Beaton & Murphy, 1993) designed to measure job-related stress for firefighters (e.g. financial strain due to inadequate pay, disruption of sleep, feelings of isolation from family due to work demands and stress, etc.). Respondents are asked to rate each of the 14 items on a 5-point Likert scale (1 = *Not at all bothered* to 5 = *Extremely bothered)*, with higher scores indicating greater occupational stress. The SOOS-14 has demonstrated good psychometric properties (Kimbrel et al., 2015). In the current study, the internal consistency for the SOOS-14 total score was excellent (α=0.90). The SOOS-14 total score was used as a covariate in the present study.

Life Events Checklist Version-5 (LEC-5; Weathers et al., 2013). The LEC-5 is a self-report questionnaire used to screen for potentially traumatic events experienced at any time throughout the lifespan. Respondents are provided a list of 16 potentially traumatic events (e.g., combat, sexual assault, transportation accident) as well as an additional item assessing for 'other' potentially traumatic events not listed. Respondents were asked to indicate (via check mark) whether each listed event "happened to me", "witnessed it", "learned about it", "part of my job", or "not sure". If participants endorsed that an event "happened to me", "witnessed it", or "part of my job", this was coded as positive exposure to that particular type of traumatic event. Total exposures were

summed to produce a 'trauma load' variable indicating the total number of traumatic life event types experienced. Trauma load (i.e., number of trauma exposure types) was included as a covariate in the current study.

PTSD Checklist for DSM-5 (PCL-5; Blevins, Weathers, Davis, Witte, & Domin, 2015). Respondents were asked to complete the PCL-5 with regard to the "worst" traumatic event endorsed on the LEC-5. The PCL-5 is a 20-item self-report questionnaire that measures PTSD symptom severity over the past month. Each of the 20 items reflects a symptom of PTSD according to *DSM-5* criteria (American Psychiatric Association, 2013). Participants are asked to rate each item on a 5-point scale (0 = *Not at all* to 4 = *Extremely*) to indicate how much they have been bothered by the symptom in the past month (e.g. "In the past month, how much have you been bothered by repeated, disturbing, and unwanted memories [of the traumatic experience]?"). Total symptom severity scores range from 0 to 80, with higher scores indicating greater symptom severity. A score of 33 or greater is the suggested cut-off for a probable diagnosis of PTSD (e.g., Bovin et al., 2016). The PCL-5 has demonstrated good psychometric properties (Blevins et al., 2015; Briere, 2001; Morey, 2007; Weathers, Litz, & Herman, 1993). Internal consistency was excellent for the PCL-5 total score in the present study (α=0.97). The total score for the PCL-5 was used as the predictor variable in the present study.

Distress Tolerance Scale (DTS; Simons & Gaher, 2005). The DTS is a 15-item self-report measure that evaluates the extent to which respondents believe they can experience and withstand distressing emotional states, rated on a 5-point scale (1 = *strongly agree* to 5 = *strongly disagree*). The DTS contains four subscales: Tolerance ("I

can't handle feeling distressed or upset"), Appraisal ("Being distressed or upset is always a major ordeal for me"), Absorption ("When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels"), and Regulation ("I'll do anything to stop feeling distressed or upset"). Total scores range from 15 to 75, with higher values indicating greater levels of distress tolerance (i.e. greater perceived ability to withstand distress). The DTS demonstrates good psychometric properties, including good internal consistency, test–retest reliability, convergent validity, and discriminant validity with established measures of mood (Simons & Gaher, 2005). For the current study, the DTS total score was used to represent the overall level of distress tolerance, as consistent with past literature (Simons & Gaher, 2005; Vujanovic et al., 2013). In the present study, internal consistency for the DTS total score was excellent ($\alpha=0.92$). For the purposes of this study, the DTS total score was used as a predictor and moderator variable.

Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De La Fuente, & Grant, 1993). The AUDIT is an extensively validated 10-item, Likert-style screening instrument developed by the World Health Organization and designed to identify individuals presenting with alcohol problems (Newcombe, Humeniuk, & Ali, 2005; Saunders et al., 1993). Scores range from 0 to 40, and the generally accepted cut-off to identify potentially hazardous drinking is 8 (Saunders et al., 1993). Severity of alcohol consumption is measured by the sum total of the first three items (Saunders et al., 1993). The AUDIT has demonstrated good test-retest reliability (Selin, 2003) and validity (Bohn, Babor, & Kranzler, 1995). The AUDIT has demonstrated high sensitivity and specificity for detecting probable alcohol dependence and hazardous or harmful drinking (Barry & Fleming, 1993; Saunders et al., 1993; Schmidt, Barry, & Fleming, 1995). The

internal consistency was good for the AUDIT total score (α=0.85) and acceptable for the

AUDIT consumption score (α=0.73) in the present study. For the current study, the

AUDIT total score was used as an outcome in analyses. In analyses examining drinking

motives as outcomes, the AUDIT consumption score was used as a covariate.

Drinking Motives Questionnaire Revised Short Form (DMQ-R-SF; Kuntsche &

Kuntsche, 2009). The DMQ-R-SF is a 12-item self-report measure designed to assess

reasons for consuming alcohol, based on the motivational model of alcohol use (Cox &

Klinger, 1988). The DMQ-R-SF measures the frequency with which individuals consume

alcohol, separated by motivation into four categories: Coping (i.e., drinking to cope with

negative emotions), Enhancement (i.e., drinking to enhance positive mood or well-being),

Conformity (i.e., drinking to conform or avoid social censure and rejection), and Social

(i.e., drinking to obtain positive social rewards). Each subscale consists of three items

summed to produce scores ranging from 3 to 9. This instrument has been validated across

international samples (Kuntsche & Kuntsche, 2009; Mazzardis, Vieno, Kuntsche, &

Santinello, 2010; Nemeth et al., 2011); and internal consistencies between 0.70 and 0.83

have been demonstrated across subscales for the DMQ-R-SF (Kuntsche & Kuntsche,

2009). The internal consistency was excellent for the DMQ-R-SF social subscale

(α=0.92), good for the conformity subscale (α=0.86), good for the coping subscale

(α=0.85), and acceptable for the enhancement subscale (α=0.70). The DMQ-R-SF

subscales were used as outcomes in analyses for the present study.

Procedure

All firefighters were recruited for participation in the parent study through a fire

department-wide e-mail. This email, sent to all firefighters in the department via list-

serve, informed them of the opportunity to complete an online research survey for one

continuing education (CE) credit and a chance to win one of several raffle prizes (e.g.,

restaurant gift cards, movie theater tickets). After reviewing a description of the survey

and the informed consent form, those who did not wish to participate or consent to the

study were given the option to decline by clicking 'no'. Once those who were interested

in taking part (by clicking 'yes') electronically signed the consent form, they were

directed to the survey. All firefighters who considered participating in the survey (and

confirmed consideration by clicking 'yes' or 'no') received one CE credit. The amount of

time required to participate in the full survey was estimated to be between 45-60 minutes.

Firefighters had the option to discontinue participation at any time without penalty. All

data were de-identified and confidentiality safeguards complied with relevant regulatory

guidelines. The study was approved by all relevant institutional review boards.

Data Analytic Strategy

All analyses were conducted using IBM SPSS version 25.0. First, the database

was evaluated for normality and missingness. Second, descriptive statistics and zero-

order correlations among study variables were examined (see Table 2). Third, a series of

five hierarchical regression analyses was conducted (see Figure 1). At step one, the

covariates of romantic relationship status, number of years in the fire service,

occupational stress, and trauma load were entered. Alcohol consumption was entered as

an additional covariate for analyses examining the DMQ-R-SF subscales as outcomes. At

step two, the predictor variables of PTSD symptom severity (PCL-5 total score) and

distress tolerance (DTS total score), both mean-centered, were entered. At step three, the

interactive effect of PTSD symptom severity (PCL-5 total score) by distress tolerance

(DTS total score) was entered.

The main and interactive effects of PTSD symptom severity (PCL-5 total score)

and distress tolerance (DTS total score) were evaluated with regard to five alcohol-related

outcomes: (1) alcohol use severity (AUDIT total score), (2) alcohol use coping motives

(DMQ-R-SF: Coping subscale), (3) alcohol use conformity motives (DMQ-R-SF:

Conformity subscale), (4) alcohol use social motives (DMQ-R-SF: Social subscale), and

(5) alcohol use enhancement motives (DMQ-R-SF: Enhancement subscale). All

continuous variables were mean-centered. Collinearity diagnostics were conducted to

evaluate multicollinearity. A Bonferroni correction (alpha = .05/5 = .01) was applied to

control for Type I error rate. Simple slope post-hoc analyses to probe significant

interactions were conducted to determine the strength of the relationship between the

predictor variable and criterion variables at different levels of the moderator.

Results

Distributions for all variables of interest approximated normality (skewness <

|2.25|; George & Mallery, 2010), except for alcohol use severity (AUDIT total score;

skewness = 2.25) and alcohol use conformity motives (DMQ-R-SR conformity subscale;

skewness = 3.05). Collinearity diagnostics were examined and confirmed an appropriate

absence of multicollinearity (variance inflation index [VIF] < 2.75; Mason & Perreault,

1991).

Bivariate Correlations

Descriptive statistics and zero-order correlations among study variables are

presented in Table 2. Regarding the theoretically-relevant covariates, years in the fire

service was significantly negatively associated with enhancement (r = -.12) and social (r = -.12) drinking motives. Occupational stress was significantly positively associated with PTSD symptom severity (r = .63), negatively associated with distress tolerance (r = -.22), and positively associated with each of the alcohol-related outcomes: alcohol use severity (r = .28), enhancement motives (r = .24), social motives (r = .23), conformity motives (r = .22), and coping motives (r = .36). Trauma load was positively associated with PTSD symptom severity (r = .12), alcohol use severity (r = .10), enhancement motives (r = .09), and conformity motives (r = .12). Lastly, alcohol consumption was positively associated with each of the alcohol use motive subscales: enhancement motives (r = .54), social motives (r = .45), conformity motives (r = .21), and coping motives (r = .44).

Among the main variables of interest, PTSD symptom severity was negatively associated with distress tolerance (r = -.36) and positively associated with alcohol use severity (r = .40). PTSD symptom severity was also positively associated with all four drinking motive subscales; enhancement (r = .25), social (r = .22), conformity (r = .31), and coping (r = .51). Distress tolerance was negatively associated with the five alcohol-related outcomes; alcohol use severity (r = -.21), enhancement motives (r = -.08), social motives (r = -.10), conformity motives (r = -.22), and coping motives (r = -.32).

Bivariate associations also were explored between sociodemographic characteristics (i.e. age, gender, race, ethnicity, current romantic relationship status, educational attainment) and the variables of interest to determine whether any additional covariates should be included in the models, as based upon whether the variable demonstrated significant associations with two or more outcome variables. Age was positively associated with distress tolerance (r = .08), as well as negatively associated

with enhancement motives (r = -.09) and social motives (r = -.11). Age was strongly

positively associated with the covariate of years in the fire service (r = .87), and

therefore, years in the fire service was used as a proxy variable for age to minimize

redundancy. Male firefighters reported lower levels of coping motives (r = -.13); gender

was not significantly associated with any other predictor or outcome variables. Patterns

and magnitudes of correlations remained consistent with the inclusion or exclusion of

transgender firefighters (n = 5). Race, ethnicity, and educational attainment were not

significantly associated with any of the main predictor or outcome variables and therefore

were not included in the main analyses. Romantic relationship status was significantly

negatively associated with alcohol use severity (r = -.09), enhancement motives (r = -

.11), and social motives (r = -.09), and firefighters currently in relationships reported

lower levels of each of these variables. Thus, romantic relationship status was the only

sociodemographic variable included as a covariate in the analyses.

Main Analyses

Regarding alcohol use severity, the first step was significant and accounted for

9% of variance (R^2 = .09, $F(4, 647)$ = 16.46, $p < .001$) and romantic relationship status

and occupational stress emerged as significant predictors (See Table 3). In step two,

statistically significant main effects emerged for PTSD symptom severity (B = .12, SE =

.02, $p < .001$) and distress tolerance (B = -.03, SE = .02, p = .03), accounting for an

additional 8% of unique variance. In step three, the interactive effect of PTSD symptom

severity and distress tolerance was not statistically significant (ΔR^2 = .002, B = -.001, SE

= .001, p = .20).

With regard to enhancement motives for alcohol use, the first step was significant and accounted for 33% of variance ($R^2 = .33$, $F(5, 646) = 62.20$, $p < .001$). Years in the fire service, occupational stress, and alcohol consumption emerged as significant predictors (See Table 3). In step two, no significant main effects emerged for PTSD symptom severity ($B = .01$, SE = .01, $p = .08$) or distress tolerance ($B = .004$, SE = .004, $p = .29$). In step three, the interactive effect of PTSD symptom severity and distress tolerance was not statistically significant ($\Delta R^2 = .000$, $B = .000$, SE = .000, $p = .76$).

Regarding socially-motivated alcohol use, the first step was significant and accounted for 24% of variance ($R^2 = .24$, $F(5, 646) = 40.70$, $p < .001$). Years in the fire service, occupational stress, and alcohol consumption emerged as significant predictors (See Table 3). In step two, no significant main effects emerged for PTSD symptom severity ($B = .01$, SE = .01, $p = .29$) or distress tolerance ($B = .001$, SE = .01, $p = .88$). In step three, the interactive effect of PTSD symptom severity and distress tolerance was not statistically significant ($\Delta R^2 = .002$, $B = .000$, SE = .000, $p = .20$).

With regard to alcohol use conformity motives, the first step was significant and accounted for 9% of variance ($R^2 = .09$, $F(5, 646) = 11.96$, $p < .001$). Occupational stress, trauma load, and alcohol consumption emerged as significant predictors (See Table 3). In step two, statistically significant main effects emerged for PTSD symptom severity ($B = .02$, SE = .004, $p < .001$) and distress tolerance ($B = -.01$, SE = .003, $p = .003$), accounting for an additional 5% of unique variance. In step three, the interactive effect of PTSD symptom severity and distress tolerance was not statistically significant ($\Delta R^2 = .000$, $B = .000$, SE = .000, $p = .66$).

Regarding coping-oriented alcohol use, the first step was significant and accounted for 27% of variance ($R^2 = .27$, $F(5, 646) = 48.17$, $p < .001$), and occupational stress and alcohol consumption emerged as significant predictors (See Table 3). In step two, statistically significant main effects emerged for PTSD symptom severity ($B = .04$, $SE = .004$, $p < .001$) and distress tolerance ($B = -.02$, $SE = .004$, $p < .001$), contributing an additional 12% of unique variance to the model. At step three, the interactive effect of PTSD symptom severity and distress tolerance was significant and accounted for an additional 2% variance in the full model ($\Delta R^2 = .02$, $B = -.001$, $SE = .000$, $p < .001$). Simple slope analyses revealed that PTSD symptom severity was significantly related to coping-motivated alcohol use for firefighters with both low ($B = .04$, $SE = .004$, $p < .001$) and high levels of distress tolerance ($B = .01$, $SE = .01$, $p = .01$), but the magnitude of the effect was strongest for those with lower distress tolerance (see Figure 2).

Post Hoc Analyses

Two sets of post hoc analyses were conducted. First, the main analyses were replicated among a sub-sample of the data which included only firefighters identifying as racial or ethnic minorities ($n = 145$), as well as a sub-sample of the data which included only male firefighters ($n = 608$). In both instances, the pattern of results and magnitudes of effect remained consistent with that reported for the larger sample ($N = 652$).

Discussion

The present study examined the main and interactive effects of PTSD symptom severity and distress tolerance in relation to alcohol use severity and alcohol use motives among a large sample of urban firefighters. All effects were examined above and beyond the covariates of romantic relationship status, years of service in the fire department,

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occupational stress, and trauma load. For analyses examining drinking motives, alcohol consumption was added as an additional covariate. Results were partially consistent with hypotheses.

PTSD symptom severity was significantly positively associated with alcohol use severity as well as coping motives for alcohol use, after considering covariates. Consistent with hypotheses, firefighters with more severe PTSD symptoms manifested greater alcohol use severity, which is in-line with extant literature (e.g., Gulliver et al., 2018; Tomaka et al., 2017). As predicted, firefighters with greater PTSD symptom severity tend to report higher levels of alcohol use to cope with negative affect. These findings are consistent with the self-medication hypothesis for PTSD/AUD (e.g., Haller & Chassin, 2014; Khantzian, 1997; Sheerin et al., 2016; Stewart et al., 1998), which suggests that those with greater posttraumatic stress have an increased tendency to use alcohol and to do so for purposes of emotion regulation and avoidance of emotional distress (e.g., Erwin et al., 2018; Homish et al., 2019; Ullman et al., 2005).

Contrary to expectation, PTSD symptom severity also was positively associated with conformity-motivated alcohol use, suggesting that firefighters with elevated posttraumatic stress may be more likely to use alcohol to avoid social rejection and conform with social groups. Thus, among firefighters in this sample, PTSD symptom severity is associated with avoidance-related alcohol use motives, broadly. Associations between PTSD symptomatology and conformity-motivated alcohol use are inconsistently documented in the literature. Among firefighters, research has demonstrated a positive association between PTSD symptom severity and conformity motives (Smith, Gallagher, et al., 2018; Tomaka et al., 2017). This positive association has also been demonstrated

among trauma-exposed college students (Berenz et al., 2016). Among military veterans who report heavy drinking, PTSD symptom severity was positively correlated with conformity motives, only for those who did *not* meet criteria for PTSD; this association was not significant for veterans who met criteria for PTSD (McDevitt-Murphy, Fields, Monahan, & Bracken, 2015). Conversely, no such association has been documented among community samples of trauma-exposed adults, where PTSD symptom severity was measured via a clinician-administered assessment (Vujanovic, Marshall-Berenz, et al., 2011). These discrepancies may be a result of population differences (i.e., firefighters, veterans, or community samples) or the measures used to assess PTSD (i.e., self-report or clinician-administered).

Furthermore, distress tolerance was significantly *negatively* associated with alcohol use severity, conformity motives, and coping motives, above and beyond the effects of covariates. That is, lower levels of distress tolerance were related to higher levels of alcohol use severity as well as alcohol use conformity and coping motives (and vice versa). Consistent with extant research, firefighters with lower levels of distress tolerance demonstrated more severe alcohol use (e.g., Himmerich & Orcutt, 2019; Holliday et al., 2016; Marshall-Berenz et al., 2011). It is likely that firefighters with a diminished perceived capacity to tolerate distress may consume greater amounts of alcohol in an effort to regulate negative affective states (e.g., Bacharach et al., 2008; Khantzian, 1997). Indeed, lower distress tolerance was also associated with coping and conformity motives for alcohol use, which is consistent with past work across community samples (e.g., Howell, Leyro, Hogan, Buckner, & Zvolensky, 2010; Vujanovic, Marshall-Berenz, et al., 2011). These findings are broadly consistent with motivational models of

alcohol use suggesting that coping and conformity are both avoidant motives, unlike

social and enhancement which are considered approach motives (Cooper, Frone, Russell,

& Mudar, 1995; Cooper, Kuntsche, Levitt, Barber, & Wolf, 2016; Cox & Klinger, 1988).

Thus, firefighters with lower distress tolerance may tend to engage in greater levels of

avoidance-related alcohol use either to avoid negative emotional states (i.e., coping) or

avoid social judgment (i.e., conformity). Notably, the literature on distress tolerance –

alcohol motives is relatively nascent and mixed, yielding inconsistent associations

between distress tolerance and motivations for alcohol use (e.g., Marshall-Berenz et al.,

2011; Williams, Vik, & Wong, 2015). Future research examining the role of alcohol use

in firefighter culture, specifically, would be informative in terms of guiding our

understanding of firefighters' motivations to use alcohol across contexts.

Hypotheses regarding interactive effects were partially supported by the data.

Distress tolerance significantly moderated the association between PTSD symptom

severity and coping-oriented alcohol use. These results suggest that firefighters with more

severe PTSD symptomatology demonstrate greater tendencies to use alcohol to cope with

negative emotional states, and this association is stronger among firefighters with lower

levels of distress tolerance (Figure 2). The interactive effect was significant above and

beyond relevant covariates but contributed only 2% of unique variance, and therefore, the

clinical significance of this effect warrants additional empirical investigation. This

moderation model builds upon extant work, which has documented only the mediating

effect of distress tolerance in the association between PTSD and coping-motivated

alcohol use among trauma-exposed community samples (Marshall-Berenz et al., 2011;

Vujanovic, Marshall-Berenz, et al., 2011). These results suggest that distress tolerance

may be a promising clinical factor to explore in future research of PTSD/AUD associations in firefighters. Targeting distress tolerance via intervention may have potential to improve outcomes in PTSD/AUD treatments in firefighters, and this line of work is worthy of further exploration.

Contrary to expectation, distress tolerance did not significantly moderate the association between PTSD symptom severity and alcohol use severity. While past work has shown distress tolerance to mediate the association between PTSD symptom severity and alcohol use severity, these findings were only demonstrated among a community sample (Duranceau et al., 2014) and a sample of young adult veterans (Holliday et al., 2016). This discrepancy in our findings may be due to factors unique to firefighter samples. For example, underreporting of alcohol use in this sample may have resulted in limited variability, which could explain the absence of an interactive effect. Notably, PTSD symptom severity and distress tolerance were each independently associated with alcohol use severity, as evidenced by the aforementioned significant main effects. Thus, it is possible that an individual's perceived level of distress tolerance may be more related to their motives for alcohol use (i.e., avoiding negative affective states), rather than alcohol use severity per se, particularly in firefighter culture where alcohol use is generally prevalent.

As anticipated, there were no significant interactive effects of PTSD symptom severity and distress tolerance with regard to other alcohol use motives (i.e., social, enhancement, and conformity). This is consistent with prior research examining the mediating effect of distress tolerance on PTSD and alcohol use motives among a trauma-exposed sample (Vujanovic, Marshall-Berenz, et al., 2011); however, the *moderating*

effect of distress tolerance on the association between PTSD symptom severity and alcohol use motives has not yet been examined in the literature with regard to any population type. Notably, although both PTSD symptom severity and distress tolerance were independently and incrementally related to alcohol use conformity motives, an interactive effect did not emerge. This is consistent with extant research examining PTSD and/or distress tolerance and conformity-motivated alcohol use among trauma-exposed and community samples (Berenz et al., 2016; Howell et al., 2010; Smith, Gallagher, et al., 2018).

To identify potentially relevant covariates in addition to those identified *a priori* (i.e., number of years in the fire service, occupational stress, trauma load, and alcohol consumption), the sociodemographic variables of age, gender, race, ethnicity, romantic relationship status, and educational attainment were evaluated with regard to correlations with the main variables of interest (see Table 2). Accordingly, race, ethnicity, and educational attainment were not included as covariates. Years in the fire service was used a proxy variable for age, as consistent with prior literature (e.g., Smith et al., 2011; Smith, Bartlett, et al., 2018; Smith, Gallagher, et al., 2018). Gender was significantly negatively correlated with *only* coping-oriented alcohol use, indicating that female firefighters reported higher levels of coping motives. As such, gender was not included as a covariate. Notably, this gender finding is inconsistent with previous research among community and trauma-exposed samples, which has not found any significant correlation between coping-oriented alcohol use and gender (e.g., Berenz et al., 2016; Dixon, Leen-Feldner, Ham, Feldner, & Lewis, 2009; Nemeth et al., 2011). Female firefighters may be more likely to endorse coping-motivated alcohol use compared to their male counterparts,

but further research is necessary to explicate any gender differences. Results of main analyses remained consistent when male-only and female-only subsamples were examined, as well as when transgender firefighters ($n = 5$) were included or excluded. Therefore, of the sociodemographic variables examined, only romantic relationship status was included as an additional covariate in the final analyses, as discussed below.

With regard to covariates, a total of five were featured in main analyses and included firefighter-specific (i.e., years in the fire service and occupational stress), trauma-related (i.e., trauma load), alcohol use-related (i.e., alcohol consumption), and sociodemographic (i.e., romantic relationship status) variables. All five variables were significantly correlated with main variables of interest at the bivariate level (see Table 2). In the regression models, occupational stress emerged as significantly positively associated with all five alcohol-related outcomes, suggesting that higher levels of occupational stress are strongly related to more severe alcohol use and greater levels of various motives for drinking. These findings are consistent with extant research among firefighters, demonstrating a significant positive association between occupational stress and alcohol use and alcohol use motives (e.g., Smith, Bartlett, et al., 2018; Smith, Gallagher, et al., 2018). Furthermore, alcohol consumption was significantly positively correlated with all four alcohol use motives, demonstrating that alcohol consumption is associated with alcohol use motives, in line with prior work among trauma-exposed and community samples (Berenz et al., 2016; Dixon et al., 2009; Howell et al., 2010; Vujanovic, Marshall-Berenz, et al., 2011).

The covariates of romantic relationship status and years in the fire service emerged as significantly negatively associated with alcohol use severity and

enhancement-motivated alcohol use as outcomes, respectively. This suggests that firefighters who are married or living with their partners may be less likely to demonstrate more severe alcohol use, perhaps due to the social support afforded by being in a relationship (e.g., Haddock, Jahnke, Poston, Jitnarin, & Day, 2016). Firefighters who have served in the department for a longer time may also be less likely to consume alcohol specifically for enhancement purposes. This is consistent with past research among firefighters (Smith, Gallagher, et al., 2018) and may be due to greater resilience, as firefighters who have sustained long-term careers in the department may be more resilient and thus, less likely to maladaptively use alcohol. Lastly, trauma load was significantly positively associated with only conformity motives and not related to any other alcohol-related outcomes. Contrary to these findings, extant research has demonstrated that trauma load is positively associated with alcohol use severity (e.g., Kim, Park, & Kim, 2018; Ullman et al., 2005) and alcohol use coping motives (Berenz et al., 2016). Because firefighters are exposed to elevated rates of trauma by virtue of their professional duties (e.g., Meyer et al., 2012; North et al., 2002), trauma load may not be directly associated with alcohol use severity and coping-motivated alcohol use while psychological sequelae resulting from trauma exposure, such as occupational stress or PTSD symptom severity, are more directly related to alcohol use severity and motives.

Notably, self-reported distress tolerance in this sample ($M = 61.76$, SD = 12.14, range = 19-75), as measured by the DTS, was substantially greater than in previous research among acute-care psychiatric inpatients (Vujanovic et al., 2017) and veterans with comorbid PTSD and substance use disorder (Vinci et al., 2016). It is possible that clinical samples may have lower levels of perceived distress tolerance due to the severity

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and impairment of their symptoms. Individuals with a greater perceived capacity to tolerate distress may also self-select into professions with a higher risk of exposure to distressing situations (e.g., firefighters, police, emergency medical service). Additionally, 9.5% of firefighters ($n = 62$) in this sample met criteria for a PTSD diagnosis per the PCL-5, while 23.0% ($n = 150$) met criteria for AUD per the AUDIT. These rates are consistent with, though albeit somewhat lower than, prior research regarding the prevalence of PTSD and AUD among firefighters (e.g.,Haddock et al., 2015; Meyer et al., 2012). Because firefighters who comprised this sample were recruited through their employing departments, it is possible that firefighters were concerned about endorsing PTSD symptoms or alcohol use, despite assurances about confidentiality.

There are notable strengths and certain limitations of this study that should be considered. First, the self-report measures facilitated the screening of a large sample; however, reporting bias and method variance cannot be ruled out. Future research extensions should include valid, interview-based assessments of PTSD and AUD, as well as behavioral indices of distress tolerance. Relatedly, the enhancement subscale of the DMQ-R-SF demonstrated only acceptable internal consistency ($\alpha = 0.70$), underscoring the need for improved psychometric evaluation of the DMQ-R-SF among firefighters. Second, the cross-sectional design of this study prevents any inferences about causality, and as such, future research is needed employing longitudinal and experimental methodologies. Third, the sample was largely socio-demographically homogeneous. As the respondents identified as predominately White and male, further inquiry is needed to determine potential factors that may have influenced participation in an otherwise racially diverse department. Future research is needed among female as well as racial and ethnic

minority firefighters to understand whether these findings generalize across sociodemographic strata. Research among more racially and ethnically diverse firefighters is necessary to more fully understand the role of cultural factors, perceived discrimination, subjective social status, or other sociocultural influences on PTSD, distress tolerance, or alcohol use. Additionally, this department consisted solely of career firefighters working in a large city, which limits our understanding of these associations among rural and/or volunteer firefighters. A crucial strength of this study is the consideration of firefighter culture and lifestyle. Contextual stress variables that were considered for this study included race, ethnicity, educational attainment, romantic relationship status, occupational stress, and trauma load. Future research may also consider income level and firefighters who work multiple jobs.

Overall, firefighters are traditionally understudied, despite demonstrated elevated prevalence rates of trauma, PTSD, and alcohol use (Haddock et al., 2015; Haddock et al., 2012; Meyer et al., 2012; North et al., 2002; Tomaka et al., 2017). There is a paucity of research focused on malleable cognitive-affective factors, such as distress tolerance, that are relevant to PTSD symptomatology and alcohol use among firefighters. Results from the current study underscore the clinical importance of distress tolerance among firefighters, as it was found to exacerbate the association between PTSD symptom severity and coping-motivated alcohol use. Future research is needed to elucidate the association of PTSD symptom severity, distress tolerance, alcohol use, and alcohol use motives among firefighters, using longitudinal or experimental paradigms and with attention to rural/volunteer, female, and racial/ethnic minority firefighters. This line of

inquiry is vital to improve understanding of and to inform treatment interventions for this

unique and vulnerable population.

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Figure 1. Conceptual model.
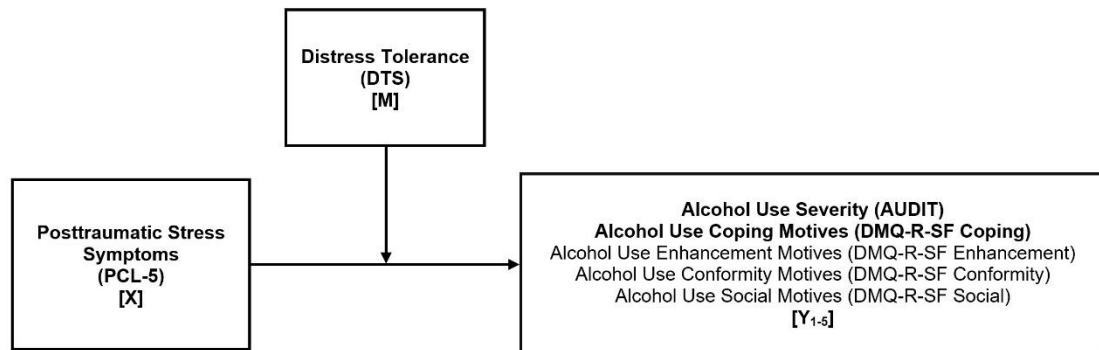
Note. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5 total score (Blevins et al., 2015); DTS = Distress Tolerance Scale total score (Simons & Gaher, 2005); AUDIT = Alcohol Use Disorders Identification Test total score (Saunders et al., 1993); DMQ-R-SF = Drinking Motives Questionnaire Revised Short Form subscales (i.e. Coping, Enhancement, Conformity, and Social; Kuntsche & Kuntsche, 2009). Distress tolerance is hypothesized to moderate the association between PTSD symptom severity and alcohol use severity as well as alcohol use coping motives. Covariates include romantic relationship status, years of service in the fire department, occupational stress, and trauma load. Alcohol consumption will be added as a covariate for analyses examining drinking motives as outcomes.

Figure 2. Interaction of PTSD symptom severity and distress tolerance predicting coping-motivated alcohol use.
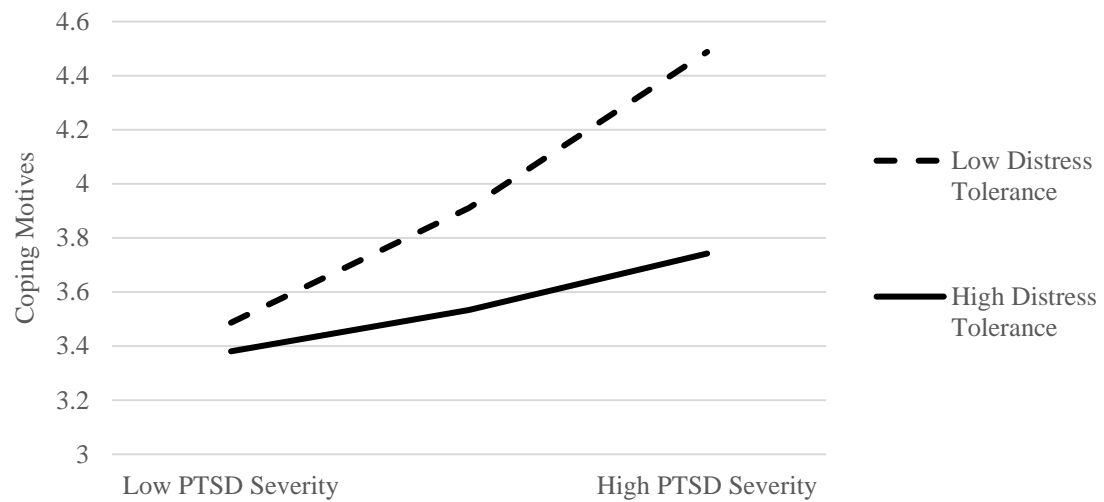
Table 1. Participant sociodemographic characteristics.

	Mean	SD
Age	38.72	8.57
Years in fire service	13.39	8.81
Trauma load	11.57	3.78

	n	Valid %
Gender		
Male	608	93.3
Female	39	6.0
Transgender	5	0.8
Race/Ethnicity		
White	507	77.8
Black or African American	71	10.9
Other	50	7.7
American Indian or Alaskan Native	12	1.8
Asian	11	1.7
Native Hawaiian or other Pacific Islander	1	0.2
Hispanic or Latinx	169	25.9
Marital Status		
Married	441	67.6
Single	123	18.9
Divorced	50	7.7
Living with partner	36	5.5
Widowed	2	0.3
Education		
8th Grade	2	0.3
Partial completion of high school or GED equivalent	293	44.9
High school graduate	303	46.5
Partial completion of college	53	8.1
College graduate	1	0.2
Trauma Exposure		
Transportation accident	635	97.4
Fire or explosion	627	96.2
Natural disaster	618	94.8
Serious accident at work, home, or during recreational activity	563	86.3
Sudden violent death	545	83.6
Sudden accidental death	537	82.4
Physical assault	535	82.1
Exposure to toxic substance	520	79.8
Assault with a weapon	485	74.4
Any other very stressful event or experience	481	73.8
Severe human suffering	449	68.9
Life-threatening illness or injury	442	67.8
Sexual assault	383	58.7
Other unwanted or uncomfortable sexual experience	281	43.1
Serious injury, harm, or death you caused to	229	35.1

someone else		
Combat or exposure to a war-zone	117	17.9
Captivity	94	14.4
Meeting criteria for:		
AUD diagnosis	150	23.0
PTSD diagnosis	62	9.5

Note. N=652; SD = standard deviation; PTSD diagnostic criteria was considered as a score of 33 or greater on the PCL-5 (Blevins et al., 2015); AUD diagnostic criteria was considered a score of 8 or greater on the AUDIT (Saunders et al., 1993).

Table 2. Descriptive statistics and bivariate correlations of study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	-																
2. Gender	-0.03	-															
3. Race	-0.04	0.02	-														
4. Ethnicity	-.12**	-0.04	.25**	-													
5. Romantic Relationship [a]	.22**	0.09*	0.04	-0.08	-												
6. Educational Attainment	.11**	.11**	0.08*	0.08*	0.04	-											
7. Years in the fire service [a]	.87**	0.01	0.03	-.15**	.21**	.19**	-										
8. Occupational Stress (SOOS-14 Total) [a]	0.04	0.01	-0.01	0.00	0.04	0.00	0.06	-									
9. Trauma load (LEC-5 Total) [a]	0.02	-0.04	0.10*	-0.01	0.06	-0.01	0.04	.18**	-								
10. Alcohol consumption [a] (AUDIT Hazardous subscale)	-0.04	-0.01	.10**	-0.06	-.08*	0.02	-0.01	.20**	0.09*	-							
11. PTSD symptom severity (PCL-5 Total) [b]	0.01	-0.05	0.00	0.00	-0.05	0.00	0.02	.63**	.12**	.23**	-						
12. Distress tolerance (DTS Total) [d]	0.08*	-0.03	-0.01	-0.05	0.04	-0.01	0.02	-.22**	0.00	-.13**	-.36**	-					
13. Alcohol use severity (AUDIT Total) [c]	-0.05	-0.04	0.07	0.00	-.09*	0.03	-0.03	.28**	0.10*	.81**	.40**	-.21**	-				
14. Enhancement drinking motives [c] (DMQ-R-SF Enhancement subscale)	-.09*	-0.05	0.01	-0.03	-.11**	0.01	-.12**	.24**	0.09*	.54**	.25**	-.08*	.51**	-			
15. Social drinking motives [c] (DMQ-R-SF Social subscale)	-.11**	-0.02	0.04	-0.03	-.09*	0.02	-.12**	.23**	0.08	.45**	.22**	-.10*	.42**	.74**	-		
16. Conformity drinking motives [c] (DMQ-R-SF Conformity subscale)	-0.05	-0.01	0.01	0.06	-0.01	0.04	-0.03	.22**	.12**	.21**	.31**	-.22**	.35**	.37**	.40**	-	
17. Coping drinking motives [c] (DMQ-R-SF Coping subscale)	-0.05	-.13**	0.02	0.01	-0.05	0.01	-0.03	.36**	0.07	.44**	.51**	-.32**	.54**	.54**	.46**	.51**	-

Mean/*n*	38.72	608	507	169	477	357	13.39	25.52	11.57	3.97	10.37	61.76	5.55	4.55	4.94	3.40	3.79
Standard Deviation/%	8.57	94.0	77.8	25.9	73.2	54.8	8.81	9.93	3.78	2.36	14.08	12.14	5.04	1.47	1.81	1.00	1.39

Note. N=647 for gender, for all other variables N=652; ** p<0.01; * p<0.05; [a] Covariate. [b] Predictor. [c] Outcome. [d] Moderator. Age = age in years; Gender = % listed as male (Coded: 0 = female, 1 = male), transgender firefighters (n = 5) were not included in this table; Race = % listed as White (Coded: 1 = American Indian or Alaskan Native, 2 = Asian, 3 = Black or African American, 4 = Native Hawaiian or Other Pacific Islander, 5 = White, 6 = Other); Ethnicity = % listed as Hispanic/Latinx (Coded: 0 = Not Hispanic/Latinx, 1 = Hispanic/Latinx); Romantic Relationship = % listed as currently in a romantic relationship (Coded: 0 = No [single, divorced, widowed], 1 = Yes [married, living with partner]); Educational Attainment = % listed as high school graduate or further education (Coded: 1 = 8th grade, 2 = Partial completion of high school or GED equivalent, 3 = High school graduate, 4 = Partial completion of college, 5 = College graduate); AUDIT = Alcohol Use Disorders Identification Test (Saunders et al., 1993); DMQ-R-SF = Drinking Motives Questionnaire Revised Short Form (Kuntsche & Kuntsche, 2009); DTS = Distress Tolerance Scale (Simons & Gaher, 2005); LEC-5 = Life Events Checklist for DSM-5 (Weathers et al., 2013); PCL-5 = Posttraumatic Disorder Checklist for DSM-5 (Blevins et al., 2015); SOOS-14 = Sources of Occupational Stress (Kimbrel et al., 2011).

Table 3. Main and interactive effect of PTSD symptom severity and distress tolerance in relation to alcohol use severity and motives.

Alcohol use severity	B	SE	t	p	95% CI		R² Change
Step 1							
Romantic relationship status	-1.135	0.436	-2.605	0.009	-1.990	-0.279	
Years in the fire service	-0.017	0.022	-0.780	0.436	-0.060	0.026	
Occupational stress	0.139	0.019	7.192	0.000	0.101	0.177	
Trauma load	0.077	0.051	1.521	0.129	-0.022	0.177	
Step 2							
PTSD symptom severity	0.119	0.017	6.852	0.000	0.085	0.153	
Distress tolerance	-0.034	0.016	-2.149	0.032	-0.065	-0.003	.083
Step 3							
PTSD symptom severity x Distress tolerance	-0.001	0.001	-1.283	0.200	-0.003	0.001	.002

Enhancement motives	B	SE	t	p	95% CI		R² Change
Step 1							
Romantic relationship status	-0.165	0.110	-1.502	0.134	-0.380	0.051	
Years in the fire service	-0.019	0.006	-3.499	0.000	-0.030	-0.008	
Occupational stress	0.022	0.005	4.375	0.000	0.012	0.031	
Trauma load	0.011	0.013	0.877	0.381	-0.014	0.036	
Alcohol consumption	0.311	0.021	15.078	0.000	0.270	0.351	
Step 2							
PTSD symptom severity	0.008	0.005	1.735	0.083	-0.001	0.017	
Distress tolerance	0.004	0.004	1.071	0.285	-0.004	0.013	.004
Step 3							
PTSD symptom severity x Distress tolerance	0.000	0.000	-0.305	0.760	-0.001	0.000	.000

Social motives	B	SE	t	p	95% CI		R² Change
Step 1							
Romantic relationship status	-0.159	0.144	-1.110	0.267	-0.442	0.123	
Years in the fire service	-0.025	0.007	-3.510	0.000	-0.039	-0.011	
Occupational stress	0.029	0.006	4.427	0.000	0.016	0.041	
Trauma load	0.008	0.017	0.496	0.620	-0.025	0.041	
Alcohol consumption	0.315	0.027	11.653	0.000	0.262	0.368	
Step 2							

	B	SE	t	p	95% CI		R² Change
PTSD symptom severity	0.006	0.006	1.066	0.287	-0.005	0.018	
Distress tolerance	0.001	0.005	0.150	0.881	-0.010	0.012	.001
Step 3							
PTSD symptom severity x Distress tolerance	0.000	0.000	-1.296	0.195	-0.001	0.000	.002

Conformity motives	B	SE	t	p	95% CI		R² Change
Step 1							
Romantic relationship status	0.005	0.088	0.057	0.954	-0.167	0.177	
Years in the fire service	-0.005	0.004	-1.236	0.217	-0.014	0.003	
Occupational stress	0.017	0.004	4.370	0.000	0.010	0.025	
Trauma load	0.021	0.010	2.077	0.038	0.001	0.041	
Alcohol consumption	0.073	0.016	4.443	0.000	0.041	0.105	
Step 2							
PTSD symptom severity	0.015	0.004	4.278	0.000	0.008	0.022	
Distress tolerance	-0.010	0.003	-3.000	0.003	-0.016	-0.003	.050
Step 3							
PTSD symptom severity x Distress tolerance	0.000	0.000	-0.442	0.659	0.000	0.000	.000

Coping motives	B	SE	t	p	95% CI		R² Change
Step 1							
Romantic relationship status	-0.052	0.108	-0.479	0.632	-0.264	0.160	
Years in the fire service	-0.007	0.005	-1.261	0.208	-0.017	0.004	
Occupational stress	0.040	0.005	8.239	0.000	0.031	0.050	
Trauma load	-0.006	0.013	-0.515	0.607	-0.031	0.018	
Alcohol consumption	0.226	0.020	11.134	0.000	0.186	0.266	
Step 2							
PTSD symptom severity	0.036	0.004	8.656	0.000	0.028	0.044	
Distress tolerance	-0.016	0.004	-4.256	0.000	-0.024	-0.009	.117
Step 3							
PTSD symptom severity x Distress tolerance	-0.001	0.000	-5.036	0.000	-0.001	-0.001	.023

Note. N=652. Alcohol use severity = AUDIT (Saunders et al., 1993); Romantic relationship status (Coded: 0 = No [single, divorced, widowed], 1 = Yes [married, living with partner]); Occupational stress = SOOS-14 (Kimbrel et al., 2011); Trauma load = LEC-5 (Weathers et al., 2013); PTSD symptom severity = PCL-5 (Blevins et al., 2015); Distress tolerance = DTS (Simons & Gaher, 2005); Coping motives = DMQ-R-SF Coping subscale (Kuntsche & Kuntsche, 2009); Alcohol consumption = AUDIT Hazardous use subscale (Saunders et al., 1993).