Post-traumatic Stress Symptoms and Alcohol-Related Outcomes Among Municipal Firefighters: Exploring the Mediational Role of Drinking Motives and Maladaptive Coping Strategies

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POST-TRAUMATIC STRESS SYMPTOMS AND ALCOHOL-RELATED OUTCOMES AMONG MUNICIPAL FIREFIGHTERS: EXPLORING THE MEDIATIONAL ROLE OF DRINKING MOTIVES AND MALADAPTIVE COPING STRATEGIES

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by

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POST-TRAUMATIC STRESS SYMPTOMS AND ALCOHOL-RELATED OUTCOMES AMONG MUNICIPAL FIREFIGHTERS: EXPLORING THE MEDIATIONAL ROLE OF DRINKING MOTIVES AND MALADAPTIVE COPING STRATEGIES

by

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ABSTRACT

Due to the frequent exposure to traumatic events, the firefighting profession places firefighters at high risk for PTSD symptoms (Berger et al., 2011). Consequently, those experiencing PTSD symptoms are inclined to consume alcohol to cope with related symptoms or to alleviate psychological distress. Two theories that guided this study are the Stress and Coping Theory (Lazarus & Folkman, 1984), and the Self-Medication Hypothesis (Khantzian, 1985). The main purpose of this study was to examine the relationship between PTSD symptoms and alcohol-related outcomes including At-Risk Drinking, Alcohol-Related Outcomes and Alcohol Consumption, in a population of El Paso firefighters (n = 740). Secondarily, this study examined the meditational role of Drinking Motives, specifically Drinking to Cope, and Maladaptive Coping Strategies, such as Substance Use, in this relationship. As expected, a positive relationship was found between PTSD symptoms and all alcohol-related outcomes. Results report that firefighters drink approximately 2 (range 0-7) days a week, for an average of 7 hours (range 0-59), and consume an average of 10 (range 0-70) drinks during a typical week. Approximately, 32.7% of firefighters are engaged in some level of At-Risk Drinking, and 46.6% have experienced Alcohol-Related Problems. It was also found that both, Drinking to Cope and Substance use, had a mediating effect on this relationship. Best model fits were those that included Drinking to Cope and Conformity motives, and Substance Use Coping Strategies as mediators on the relationship of PTSD symptoms on alcohol-related outcomes. Findings in this study indicate the need for prevention strategies for stress-related disorders as well as alcohol-related intervention programs. There needs to be an increase in support for the firefighter profession in order to strengthen education on how to prevent or reduce the onset of PTSD symptoms, as well decrease alcohol consumption and alcohol-related outcomes. Implementing a general approach in the education of coping strategies may be more effective in this particular population than the teaching of specific types of coping. Strengths and limitations of this study are discussed.
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CHAPTER 1: INTRODUCTION

Professional firefighting is known to be among the most dangerous professions in the U.S. (Murphy, Beaton, Pike, & Johnson, 1999). Due to the wide variety of job duties, firefighters are exposed to a wide array of traumatic incidents. Experiences include, but are not limited to, threats of injury or death to self and others, deaths and injuries of other people of all ages, gruesome accidents, body handling, suicides, mass casualties, and delivering news of tragedy to friends and family members (Beaton, Murphy, Johnson, Pike, & Corneil, 1999; Murphy et al., 1999). Moreover, being a firefighter involves disrupted and lack of sleep, a major source of occupational stress among this population which may affect physical and mental health (Murphy, Bond, Beaton, Murphy, & Johnson, 2002).

Additionally, firefighters in many municipalities are often required to be certified as Emergency Medical Technicians (EMTs), resulting in an increase of firefighter duties. For example, El Paso Fire Department (EPFD) firefighters are responsible for addressing calls to fires as well as medical emergencies, water rescues, hazardous materials incidents, vehicle and aircraft accidents, search and rescue events, and many other crises (City of El Paso, Texas, 2012). In fact, in urban areas of the U.S., approximately 60-80% of calls to fire departments involve medical emergencies (Murphy et al., 1999).

Such exposures have significant consequences. For example, post-traumatic stress disorder (PTSD) prevalence among firefighters ranges from 16% to 50% (Murphy et al., 1999), which is significantly higher than the general population where it ranges from 8% to 9% (Grinage, 2003). Although each individual copes with stressful events differently, about 30% of firefighters have current problems with alcohol use, double that of the general population (Bacharach, Bamberger, & Doveh, 2008). A possible explanation for this association is the self-medication hypothesis, which implies that when experiencing psychological distress, such as PTSD, individuals attempt to alleviate distressful memories of the traumatic incidents by using
alcohol or other drugs (Suh, Ruffins, Robins, Albanese, & Khantzian, 2008). Additionally, stress and coping theory suggests that, regardless of PTSD symptoms, firefighters may cope in a number of maladaptive ways, including substance use, in order to deal with their stressful occupational demands and their constant exposure to traumatic incidents (Lazarus & Folkman, 1984).

The present study examined relationships between PTSD symptoms and alcohol-risk levels, alcohol-related problems, and alcohol consumption among firefighters employed by the city of El Paso. Additionally, this study examined possible mechanisms linking PTSD symptoms and drinking outcomes by examining the reasons why people say they drink, called Drinking Motives in the research literature (Cooper, 1994), as well as the strategies they may use to cope with stress more generally (Carver, 1997). More specifically, this study examined the following: 1) how drinking motives, in particular, drinking to cope, mediate the relationship between PTSD and alcohol-related outcomes, and 2) how the use of avoidant, sometimes called maladaptive, coping strategies mediate the relationships between PTSD symptoms and alcohol-related outcomes. The study hypotheses were that PTSD symptoms will relate positively to alcohol-use and related outcomes, and that drinking to cope motives and avoidant coping strategies will mediate this relationship.

Post-traumatic Stress Disorder

PTSD is an anxiety disorder that occurs after an individual has experienced a traumatic event (National Institute of Mental Health [NIMH], 2009). According to the DSM-IV TR, experience of a traumatic event is when a person has “witnessed, or been confronted with at least one event that involves actual or threatened death or serious injury, or a threat to the physical integrity of self or others” (American Psychiatric Association [APA], 2000, “DSM-IV-TR Criteria for PTSD,” para. 4). A person’s response to the event must have “involved intense fear, helplessness, or horror” (APA, 2000, “DSM-IV-TR Criteria for PTSD,” para. 5). Common PTSD-precipitating traumatic events include things such as combat or military exposure, child sexual
or physical abuse, terrorist attacks, sexual or physical assaults, serious accidents including car wrecks, and natural disasters such as fires, tornadoes, hurricanes, floods, or earthquakes (US Department of Veterans Affairs, 2011). Not all individuals who experience trauma develop PTSD. Additionally, those that do develop the condition may not have personally experienced the traumatic event. Indirect exposure to a traumatic incident, such as watching the news of the event on television or having a close friend or relative experience danger, or is a victim of harm, may also lead to an individual developing PTSD (National Alliance of Mental Illness [NAMI], 2011).

**PTSD Symptoms**

After exposure to traumatic events, individuals may develop a specific set of stress reactions including (a) re-experiencing symptoms, (b) avoidance and numbing symptoms, and (c) hyperarousal symptoms (NIMH, 2009). People are typically diagnosed with PTSD when these symptoms do not disappear on their own or get worse over time.

*Re-experiencing symptoms* refer to frightening thoughts, bad dreams, or flashbacks that may appear at any time and where individuals feel as if they are reliving the trauma once again (NIMH, 2009). Such symptoms are often triggered by a sound, image, smell or words that are similar to the traumatic event. For instance, seeing a car accident might remind a crash survivor of his or her own accident. These distressing recollections can appear so real and vivid that the person might have difficulty knowing if it is reality or only a memory (Nebraska Department of Veterans’ Affairs, 2007).

*Avoidance and numbing symptoms* are attempts people make to avoid remembering or reliving the traumatic event (Nebraska Department of Veterans’ Affairs, 2007). These symptoms include, staying away from places, events, or objects that remind them of the traumatic experience, feeling emotionally numb, having strong feelings of guilt, depression, or worry, losing interest in previously enjoyed activities, and having trouble remembering the traumatic experience (NIMH, 2009). For example, a combat veteran may feel guilty because of the death
of a fellow soldier. As a result of these symptoms, individuals often change their personal routines. For instance, an earthquake survivor may stay away from places near where the earthquake occurred or avoid watching news reports on the event.

*Hyperarousal symptoms* may appear as being easily startled, feeling tense or “on-edge”, having difficulty sleeping and/or having angry outbursts (NIMH, 2009). Individuals feel alert and on the lookout for danger, as if waiting for something to happen. These symptoms appear constantly, unlike other symptoms that are triggered by things that remind them of the traumatic experience (NIMH, 2009). They are very disrupting of normal routines and make it difficult to continue with daily activities (Nebraska Department of Veterans’ Affairs, 2007).

**Prevalence**

Although more than two thirds of U.S. adults experience a significant traumatic event at some point in their lives (Galea, Nandi, & Vlahov, 2005), the overall lifetime prevalence of PTSD in the American population is much less and approximately between 8%-9% (Grinage, 2003). When comparing both genders, PTSD is more common among women (10%) than men (5%; Grinage, 2003; Peterson, Luethcake, C.A., Borah, E.V., Borah, A.M., & Young-McCaughan, 2011). According to the Anxiety Disorders Association of America (ADAA), approximately 7.7 million people in the United States of ages 18 and older have been diagnosed with PTSD. When observing different kinds of exposures, individuals exposed to mass violence events have the greatest chance of developing PTSD, a rate higher than those exposed to natural disasters or other types of life threatening events (ADAA, 2011). In terms of PTSD prevalence among war veterans, these numbers display a significant increase. Richardson, Frueh, & Acierno (2010) report a prevalence of roughly 6% to 31% among U.S. war veterans. Combat-related PTSD reveals a higher prevalence among veterans when compared to civilian populations (Richardson, et al., 2010).

**PTSD Comorbidities**
PTSD is often accompanied by other comorbid disorders. The National Comorbidity Survey (1990-1992) estimates that about 88% of men and 79% of women who have had PTSD have at least one comorbid psychiatric disorder (Grinage, 2003). According to Grinage (2003), the most common comorbidities are clinical depression, alcohol, drug abuse, and other anxiety disorders (e.g., phobias). It is estimated that more than 50% of the male population with PTSD have problems with alcohol (Grinage, 2003). The next most prevalent comorbid disorders for men include depression, conduct disorder, and subsequently problems with drugs. On the other hand, studies report that depression is the most common co-occurring problem for women with PTSD, followed by specific fears, social anxiety, and subsequently problems with alcohol. Other PTSD related consequences include social problems like spousal abuse, divorce or separation as well as job-related consequences such as risk of being fired and unemployment. These consequences are higher among PTSD individuals than in the general population (Nebraska Department of Veterans’ Affairs, 2007).

Etiology

As described, PTSD is a reactive condition initiated by exposure to a traumatic stressor in which a person experiences intense fear, helplessness, or horror (APA, 2000). This condition is identified clinically once symptoms continue for months or years after the traumatic incident has occurred. Severity, duration, and proximity to the precipitating event are factors related to the development of the condition (NAMI, 2011). For example, severe events, such as sexual assaults are more likely to cause PTSD symptoms than less severe ones like public humiliation or “bullying.” Likewise, if a person is exposed to a particular trauma repeatedly, such as ongoing physical abuse throughout a number of years, there is a much greater chance of that person developing PTSD. This is similar in regards to proximity; a person has a higher risk of developing PTSD when he or she is nearer to rather than farther from the traumatic event. For example, an individual surviving the 9/11 World Trade Center terrorist attack has a higher
probability of experiencing PTSD symptoms after the event, when compared to someone who experienced it indirectly through news reports (NAMI, 2011).

In a combat-related setting, PTSD is strongly and positively correlated with combat experiences, such as being attacked or shot at, firing on or killing the enemy, and seeing or handling human remains (Peterson et al., 2011). The most common types of exposures in war veterans include artillery, rocket or mortar fire, gunshot, seeing dead bodies or human remains, being attacked or ambushed, and knowing someone is seriously injured or killed (Peterson et al., 2011).

Even though PTSD has been mainly examined among military personnel and war veterans, civilian populations are also exposed to divergent traumatic events or disasters that may trigger this disorder. Noncombatants also encounter multiple types of traumatic exposures such as surviving or witnessing a natural disaster, terrorist event, sudden death of a loved one, violent personal assault such as rape, or other life-threatening assaults that may contribute to the development of PTSD. The type of trauma more commonly experienced among the general population is witnessing someone being badly injured or killed, being involved in a fire, flood or other natural disaster and experiencing a life-threatening accident (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). According to the National Comorbidity Survey (1990-1992) the traumas mostly associated with PTSD among men are combat exposure (28.8%) followed by witnessing someone being badly injured or killed (24.3%). For women, rape (29.9%) and sexual molestation (19.1%) were reported to be the most traumatic incidents and most commonly associated with PTSD (Kessler et al., 1995). Among those who reported rape experiences, 65% men and 45.9% women developed PTSD (Kessler et al., 1995).

**Risk and Resilience Factors**

As mentioned above, not every person who experiences a traumatic event develops PTSD (NIMH, 2009). Some will experience no PTSD symptoms, some mild symptoms, and some severe symptoms. Moreover, among those experiencing symptoms, some will see
declines in their frequency and fully recover, whereas others will not. Risk and resilience factors are those conditions or circumstances that influence the person’s reactions during and following a disaster. Risk factors are reasons that make it more likely for an individual to have more severe or longer lasting stress reactions after a traumatic event (US Department of Veterans Affairs, 2011). Risk factors for PTSD include severity of the traumatic exposure, history of mental illness, experiencing injury or seeing someone else injured, poor support from loved ones, feeling horror, helplessness or extreme fear, and dealing with other stressors after the disaster such as the death of a loved one, pain or injuries, separation from a loved one, or the loss of employment or home. (US Department of Veterans Affairs, 2011; NIMH, 2009). In addition, gender and age are also risk factors, with women being more at risk than men, and individuals between 40-60 years of age more likely to be distressed after disasters (US Department of Veterans Affairs, 2011).

Resilience factors are conditions that either dampen reactions to trauma or aid recovery over time. Resilience factors for PTSD include positive strategies for example, seeking social support from others, such as friends and family, coping self-efficacy, and having a more positive emotional reaction to the event such as hope, optimism and believing that the situation will work out for the better. (US Department of Veterans Affairs, 2011; NIMH, 2009).

**PTSD and Alcohol Use**

Research has shown that exposure to trauma in the form of natural disaster, assault, or combat events results in increases in alcohol consumption in the general population. Specifically, one study found that a 1972 flood in West Virginia lead to a 30% increase in alcohol consumption among residents in the 2-year period following exposure to the trauma (Stewart, 1996). A similar relationship was found between exposure to grotesque death and alcohol abuse in a sample of survivors of the 1977 Beverly Hills Supper Club fire, an effect that was particularly strong among those involved in rescue efforts (i.e. exposure to burned and mutilated bodies; Stewart, 1996).
This general phenomenon is particularly relevant in cases of PTSD. For example, Stewart (1996) found that at a 14-year follow-up on the 1972 flood in West Virginia, PTSD diagnosis was significantly associated with alcohol abuse diagnosis. Similar efforts have been found in combat veterans. Research reports that combat-exposed men have a higher prevalence of alcohol abuse than non-combat exposed men (Stewart, 1996). Specifically, a study comparing men who served in combat in Vietnam to military soldiers not exposed to combat reported a significantly higher number of Vietnam combatants meeting criteria for alcohol abuse (78% vs. 36%; respectively). Hence, evidence suggests there may be a positive association between the degree of exposure and abusive alcohol consumption (Stewart, 1996). Accordingly, alcohol abuse is a common PTSD comorbidity. Overall, researchers estimate that approximately 52% of men and 28% of women with PTSD also meet criteria for alcohol abuse or dependence, as compared with 25% of men and 11% of women without PTSD (Hruska, Fallon, Spoonster, Sledjeski, & Delahanty, 2011; Vujanovic, Marshall-Berenz, Zvolensky, 2011).

These findings are consistent with McFarlane (1998) who reviewed the evidence linking PTSD to alcohol abuse. After analyzing the strength of association between PTSD and alcohol abuse among three different populations (i.e. firefighters, psychiatric patients and female prisoner victims of child abuse)—all experiencing different types of traumatic events—McFarlane (1998) concluded that although there is no simple relationship, a significant association exists between PTSD and drug abuse/dependence, including alcohol use.

Consistently, Chilcoat & Breslau (1998) reported similar results. In clinical and community-based samples, they demonstrated strong and consistent associations between PTSD and alcohol abuse/dependence.

While it is known that this relationship exists, additional research has been conducted to further explain this relationship. One hypothesis is that alcohol abuse after exposure to trauma is best explained as means of coping with PTSD symptoms (Stewart, 1996). Specifically, Vujanovic et al. (2011) have suggested that trauma-exposed individuals experiencing PTSD
symptoms demonstrate an enhanced motivation to consume alcohol to cope with negative emotional states. In this relationship, alcohol serves as a negative reinforcer, helping individuals to avoid or reduce symptoms of traumatic stress that follow a traumatic event exposure or from re-experiencing the event. Similarly, Dixon, Leen-Feldner, Ham, Feldner, & Lewis (2009) state that adults who have been exposed to a traumatic event drink to cope with general PTSD symptoms such as sleep difficulties, negative affect, and PTSD symptoms specific to the traumatic event including intrusions/re-experiencing and hyperarousal symptoms.

**Drinking Motives**

Anderson, Grunwald, Beckman, Brown, & Grant (2011) define drinking motives as “reasons based on beliefs that alcohol will increase positive effect or reduce negative effect, characterizing one pathway to alcohol consumption” (p. 1). Cox and Klinger (1988, 1990) have proposed a framework that categorizes drinking motives according to valence (positive or negative) and source (internal or external) of the outcomes individuals hope to reach by drinking (Cooper, 1994; Kuntsche, Knibbe, Gmel, & Engels, 2005). According to this framework, valence can be positive (to enhance positive moods) or negative (to avoid or decrease negative experiences) and the source of the expected effects can be either internal (regarding the personal affective state) or external (regarding the individual social environment; Kuntsche et al., 2005).

As a result of this framework, Cooper (1994) developed four categories of drinking motives: a) enhancement, b) social, c) coping, and d) conformity. *Enhancement motives* (positive, internal) suggest that individuals drink in order to enhance positive mood or well being. *Social motives* (positive, external) propose that individuals drink to obtain social rewards such as improving social gatherings, social facilitation or to get in a party mood. *Coping motives* (negative, internal) introduce individuals who drink to decrease negative emotions and reduce tension. Lastly, *conformity motives* (negative, external) suggest that individuals drink in order to avoid social rejection (Kuntsche et al., 2005).
In samples of college students, Kuntsche et al. (2005) and Cooper (1994) clarify that social motives appear to be associated with moderate, non-problematic alcohol use. According to Kuntsche et al. (2005) studies indicate a negative relationship between social motives and drinking intensity among US college students, suggesting that those who drink due to social motives were less likely to use alcohol excessively than those who drink due to enhancement or coping motives. Conversely, coping and enhancement motives are related to heavier alcohol use and alcohol-related problems (Kuntsche et al., 2005). Heavy drinkers tend to score higher on enhancement motives scales, specifically “drinking to get drunk”, and on coping scales, specifically tension reduction drinking. A possible explanation to these results is that adolescents may drink to feel the effects of alcohol and to reduce daily pressures (Kuntsche, Stewart, & Cooper, 2008). Similarly, those drinking for conformity motives have higher alcohol-related problems, indicating that adolescents may have problems with peer pressure around alcohol consequently increasing drinking to conform (Kuntsche et al., 2008).

PTSD and Alcohol Use Among Rescue Workers

This study will examine non-combat related PTSD among rescue workers. Rescue workers can be defined as individuals who “professionally or voluntarily engage in activities devoted to provide out-of-hospital acute medical care; transportation to definitive care; freeing persons or animals from danger to life or well-being in accidents, fires, bombings, floods, earthquakes, and other disasters and life-threatening conditions” (Berger et al., 2011, Introduction section, para. 1). According to Berger et al. (2011), rescue workers such as police, fire and rescue personnel, and EMTs are exposed to recurrent and severe traumatic experiences. Accordingly, they are subsequently at risk of developing PTSD. Based in the literature, it can be suggested that due to their higher PTSD rates, they are at increased risk for alcohol-related problems.

In the present study, the main focus will be on a specific group of rescue workers, specifically firefighters who also have EMT certification. As noted above, professional firefighting
is widely known to be among the most dangerous and stressful professions. Being a firefighter involves being exposed to hazardous conditions and working long irregular hours. Firemen are assigned 24-hour shifts that are often sleep-disrupted (Murphy et al., 1999) by response calls to not only fires, but also other life-threatening situations (City of El Paso, Texas, 2012). In fact, the majority of calls that firefighters respond to are due to medical emergencies (Murphy et al., 1999). This profession in particular is exposed to trauma repeatedly and frequently which may increase the risk of PTSD and subsequently increase alcohol use as firemen function as EMTs as well (Murphy et al., 1999).

Rescue workers experience PTSD at rates higher than that of the general population (Berger et al., 2011; Galea et al., 2005). It is estimated that PTSD prevalence rates range from 16% to 50% (Murphy et al., 1999). Corneil, Beaton, Murphy, Johnson, & Pike (1999) examined duty-related trauma exposures and PTSD prevalence among U.S. firefighters and estimated that approximately 22% of Northwestern firefighters have PTSD, higher than the general population estimate of 8%-9% provided by Grinage (2003). Murphy et al. (1999) also portray similar results, with about 20% of firefighters sampled meeting DSM-IV criteria for PTSD.

Similar to the increased rates of PTSD, it is estimated that approximately 29-30% of firefighters have possible current problems with alcohol use, double of the general population (Boxer & Wild, 1993; Murphy et al, 1999). In a sample of 469 firefighters who had an intense exposure to a bushfire disaster, 41.8% were abusing alcohol. Of these, 37 were diagnosed with PTSD, indicating an association between PTSD and alcohol abuse (McFarlane, 1998).

**Theoretically Based-Explanations for the Relationship Between PTSD Symptoms and Alcohol-Related Outcomes Among Firefighters**

Two related theories help explain the relationship between PTSD symptoms and alcohol use and abuse. Stress and coping theory suggests that individuals with PTSD use avoidant coping, such as alcohol use to deal with daily stressors. The self-medication suggests that
individuals turn to alcohol to alleviate these distressful emotions associated with experiencing PTSD symptoms.

**Stress and Coping Theory**

Coping can be described as ways individuals deal with stressful life situations (Lazarus, 1999). Lazarus & Folkman’s theory on psychological stress argues that stress is a relation between the individual and the environment (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Two concepts in Lazarus & Folkman’s theory on psychological stress are cognitive appraisal and coping. Cognitive appraisal is an individual’s evaluation of a particular encounter with the environment and its implication to his or her well being (Folkman et al., 1986). Coping can be defined as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the person’s resources” (Lazarus & Folkman, 1984, p.141). In theory, these two concepts act as mediators between external events and our responses to them (Folkman et al., 1986).

According to Folkman et al. (1986), three features describe coping. Firstly, coping is process-oriented which means that coping efforts unfold over time, including how the person’s thinking and actions change as the stressful event evolves. Secondly, coping is contextual, meaning that coping depends on the particular situation. For example, coping processes in anticipation of final exams may be quite different than coping responses in response to receipt of final grades. Regardless, coping in all situations is influenced by a person’s appraisal of the actual demands in the stressful encounter and the means for dealing with them. Thirdly, coping thoughts and actions are separate from their outcomes. Coping reflects a person’s efforts to deal with demands, independent of whether they are successful or not. For example, making an attempt to find support groups that will help get through the stressful situation, or trying to reappraise the situation from an optimistic perspective.

According to Lazarus (1993) coping can affect stress reactions through two functions: emotion-focused coping and problem-focused coping. Emotion-focused coping reflects efforts
specifically aimed at alleviating stress-related negative emotions. Emotion-focused coping includes things such as denying that the event happened, avoiding thoughts of it, or self-medicating with alcohol or drugs. Problem-focused coping reflects the individual’s attempts to change the situation for the better, or more specifically, use of efforts to alter his or her relationship with the environment. This can include efforts to solve or manage the problem, consequently reducing psychological stress (Lazarus, 1993). Additionally, coping strategies can be viewed as approach-oriented and avoidance-oriented strategies. Approach-oriented are positive coping strategies that will aid in reducing stress such as active coping, planning, and acceptance. Avoidance-oriented strategies may reduce stress symptoms temporarily but will maintain or strengthen the disorder, including denial, substance use, and behavioral disengagement.

**Self-Medication Hypothesis**

A prominent explanation between PTSD symptomology and alcohol use is the self-medication hypothesis. The self-medication hypothesis is a theory of substance addiction that studies emotional and psychological dimensions of substance abuse disorders (Suh et al., 2008). According to Suh et al. (2008), due to alcohol’s depressive effect on the central nervous system, people consume it to experience relaxing and sedating effects, especially when suffering from symptoms of distress.

The self-medication hypothesis provides a causal explanation for the investigation of PTSD and drug disorders, including alcohol abuse. According to Khantzian’s self-medication of addictive disorders, “addicts are attempting to medicate themselves for a range of psychiatric problems and painful emotional states” (Khantzian, 1985). The hypothesis emphasizes that individuals use drugs, including alcohol, to alleviate symptoms from treated and untreated mental illnesses, such as PTSD. Suh et al (2008) explains that individuals perceive dysphoric emotions as intolerable and overwhelming and feel that these emotions are unmanageable, consequently seeking a way to regulate these distressful emotions by using drugs. Particularly,
this hypothesis consists of two predictions: 1) alcohol abuse reduces anxiety temporarily, providing a mechanism for negative reinforcement by avoiding PTSD symptoms, and 2) PTSD development precedes the development of alcohol use disorders (Cisler et al., 2011).

Consistent with Brown & Wolfe (1994), as individuals experience PTSD symptoms, chemical substances such as alcohol are used as means of reaching symptom relief. Patients with diagnosed PTSD describe using alcohol and/or drugs to overcome trauma-related stress and avoid intrusive, disturbing memories of the experienced trauma (Brown & Wolfe, 1994). Vujanovic et al. (2011) support such evidence by reporting that the severity of symptoms is significantly associated with drinking to cope with negative affect. Trauma-exposed individuals with alcohol dependence report alcohol cravings when trauma cues are present, thus an increase in alcohol consumption follows (Vujanovic et al., 2011; Coffey, Stasiewicz, Hughes, & Brimo, 2006). This association is particularly relevant to those with PTSD, since PTSD frequently produces intense negative emotions, therefore stimulating a craving for a preferred substance to lessen emotional distress (Coffey et al., 2006).

**Purpose of Study**

The purpose of this study was to examine the relationship of PTSD symptoms and alcohol use and related outcomes including at-risk drinking and alcohol-related problems among El Paso firefighters. Additionally, two mediational analyses were conducted to examine the possible mediating effect on this relationship: 1) drinking motives, in particular drinking to cope, and 2) maladaptive coping strategies, such as substance use. Accordingly, the study had the following hypotheses:

1) There will be a positive relationship between level of PTSD symptoms and alcohol use and related outcomes among municipal firefighters.

2) Drinking motives, in particular drinking to cope, will mediate the relationship between PTSD symptoms and alcohol use and related outcomes.
3) Avoidant or maladaptive coping strategies, such as substance use coping, will mediate the relationship between PTSD symptoms and alcohol use and related outcomes.
CHAPTER 2: METHODS

Design Overview

The current cross sectional study consisted of secondary analysis of existing data (see Morales-Monks, 2012). This study used existing assessment data to examine the relationship between PTSD symptoms and alcohol use and related outcomes, including at-risk drinking levels and alcohol-related problems, as well as examine the possible mediating effect of drinking to cope and avoidant coping strategies on this relationship.

Setting

The city of El Paso is situated on the border of Mexico by the Rio Grande, next to Ciudad Juarez, Chihuahua. Participants in the proposed study were firefighters employed by the El Paso Fire Department (EPFD). The larger study was conducted at the EPFD Training Academy for a larger scale intervention project in which firefighters received one of three alcohol interventions, including BASICS Psychoeducation + Personalized Normative Feedback (PNF), PNF only, or a standard DWI presentation given by the El Paso Police Department (see Morales-Monks, 2012). Prior to the intervention, firefighters completed a health assessment packet. Only the information provided prior to the intervention was used for the present study.

Participants

Participants for the analysis included 740 uniformed firefighters out of an approximate population of 844 from the EPFD. All 740 completed a health assessment administered by research assistants. This study was approved by the UTEP Institutional Review Board and all firefighters participated voluntarily.

Measures

Demographics. Demographic items included in the health assessment include age, ethnicity, race, marital status, sex, number of years being a firefighter, rank, and current shift assignment.
**Alcohol Use Disorders Identification Test (AUDIT).** The AUDIT is a tool that is used to identify individuals with hazardous and harmful patterns of alcohol consumption (Babor, Higgins-Biddle, Saunders, & Monterio, 2001). The AUDIT is a 10-item questionnaire that classifies alcohol risk levels into 3 categories: hazardous alcohol use, harmful alcohol use, and dependence symptoms. This instrument includes questions regarding at-risk drinking within the past 3 months, which is a modification of the regular AUDIT that asks about drinking behaviors during the past year. The answers are scored on a range from 0 to 40 and scores of 8 or greater are suggestive of “at-risk drinking”. Barbor et al. (2011) state that a score of 7 and below is considered “low risk” drinking; 8-15 “medium risk” drinking; and 16-40 “high risk” drinking. The AUDIT has a reliability of $\alpha= .86$ (Barbor et al., 2001).

**Rutgers Alcohol Problems Index (RAPI).** The RAPI includes 23-items which analyzes the frequency of alcohol-related problems experienced within the last three months, which is a modification of the regular RAPI that asks the frequency of alcohol-related problems within the last year (White & Labouvie, 1989). Certain statements included in the RAPI include, “How often have you neglected your responsibilities?” “How often have you got into fights, acted bad or did mean things with other people (friends, relatives, strangers)?” Answers include, never, 1-2 times, 3-5 times, 6-10 times, or more than 10 times. The scoring ranges from 0-92, with higher scoring suggesting a higher frequency and/or quantity of alcohol-related problems. The RAPI has a reliability of $\alpha= .92$ (White & Labouvie, 1989).

**Daily Drinking Questionnaire (DDQ-Modified).** The DDQ assesses typical consumption of alcoholic beverages by asking drinking patterns during a “typical week” within the last month (Collins, Parks, & Marlatt, 1985). Three behavioral measurements are evaluated which include, a) the overall number of days alcohol was consumed within a typical week; b) the overall number of drinks consumed within a typical week; and c) the overall number of hours an individual spent drinking within a typical week.
PTSD Checklist-Civilian Version (PCL-C). The PCL-C is a 17-item tool used to assess levels of distress that have co-occurred with each PTSD symptom within the past 30 days in relation to “stressful life experiences” (Ruggiero, Del Ben, Scotti, & Rabalais, 2003). The PCL-C is based on DSM-IV Criteria B, C, and D for PTSD (symptoms of intrusion, avoidance, and hyperarousal, respectively) (Ruggiero et al., 2003). Statements included in the PCL-C involve, “Repeated, disturbing memories, thoughts, or images of stressful experiences from the past?” and “Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)?” Responses are in the form of a 5 point scale including, 1=not at all, 2=a little bit, 3=moderately, 4=quite a bit, and 5=extremely. Three PCL instruments include PCL-C (civilian version), PCL-M (military version), and PCL-S (specific event version). From a total score ranging from 17-85, various cut off points of 44, 45, and 50 have been recommended for the PCL (Ruggiero et al., 2003). For the purposes of this study, a cut off point of 44 will be used to increase sensitivity. In general, the PCL instruments have a reliability ranging from α= .94 to α=.96 (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Weathers, Litz, Herman, Huska, & Keane, 1993).

Drinking Motives Questionnaire (DMQ-Revised). The DMQ-R is a 20-item instrument that assesses reasons why individuals might be motivated to drink alcohol (Cooper, 1994). The DMQ-R is a four factor model examining the following four motive scales: 1) social α= .96, 2) coping α=.89, 3) enhancement α=.96, and 4) conformity α=.93 (Anderson et al., 2011). Items included in the DMQ-R include, “How often do you drink to forget about your worries?” and “How often do you drink because it helps you when you feel depressed or nervous?” Responses are on a 6 point scale ranging from 1=never to 6=almost always. For the purposes of this study, drinking to cope is the primary drinking motive of interest.

Brief Cope. The Brief Cope is a 28-item instrument that assesses an individual’s coping skills (Carver, 1997). Adaptive and problematic (maladaptive) scales included in the Brief Cope are the following: 1) active coping α=.68, 2) planning α=.73, 3) positive reframing α=.64, 4)
acceptance $\alpha = .57$, 5) humor $\alpha = .73$, 6) religion $\alpha = .82$, 7) using emotional support $\alpha = .71$, 8) using instrumental support $\alpha = .64$, 9) self-distraction $\alpha = .71$, 10) denial $\alpha = .54$, 11) venting $\alpha = .50$, 12) *substance use* $\alpha = .90$, 13) behavioral disengagement $\alpha = .65$, and 14) self-blame $\alpha = .69$ (Carver, 1997). All items ask how the individual has been dealing with stress within the past 3 months, on a scale of 1 to 4 including the following: 1=I haven’t been doing this at all, 2= I’ve been doing this a little bit, 3=I’ve been doing this a medium amount, and 4= I’ve been doing this a lot. For the purposes of this study, the substance use coping and avoidant coping (as a composite coping variable) are the primary coping strategies of interest.

**Procedures**

As part of the larger scale study, firefighters attended the EPFD Training Academy in groups of 20-30. The study investigator and research assistants greeted all firefighters. The purpose and content of the study and consent form was thoroughly explained to the group and time was given for firefighters to ask any additional questions. After all questions were addressed and consent forms were signed, research assistants distributed health assessment packets. Firefighters then completed the health assessment, which took approximately 45-60 minutes. Once all health assessments were collected, firefighters received an alcohol risk reduction intervention. All data to be used for the proposed study was collected prior to intervention.

**Statistical Analysis Plan**

The present study employed a cross-sectional survey design. All analyses were conducted using SPSS Version 19.0 and SPSS AMOS Version 19. Preliminary analyses consisted of descriptive statistics, including means (SD) or percentages (when appropriate), for all demographic and outcome variables using SPSS Descriptives.

Primary analyses had two phases. The first examined the zero-order correlations among all the study variables via a table of correlation coefficients constructed from SPSS Correlation. The second phase examined the hypotheses regarding associations between PTSD symptoms
and alcohol use and related outcomes, and their potential mediation by maladaptive coping and drinking motives, by testing path and possibly structural models in SPSS AMOS. Figure 1 shows the general theoretical model that guided these analyses.

*Figure 1.* Proposed mediational model of PTSD Symptoms on Maladaptive Coping and Drinking Motives and their effect on Alcohol-Related Outcomes.

**Anticipated Results**

Consistent with the literature, it was anticipated that there would be a positive relationship between PTSD symptoms and alcohol use and related outcomes. Additionally, drinking motives, in particular drinking to cope, and maladaptive coping strategies, specifically alcohol and drug use, would mediate the relationship between PTSD symptoms and alcohol related outcomes. Figure 2 illustrates the theoretical model according to anticipated results.
Figure 2. Anticipated mediational model of PTSD Symptoms on Maladaptive Coping and Drinking Motives and their effect on Alcohol-Related Outcomes.
CHAPTER 3: RESULTS

Preliminary Analyses

*Data screening and checking.* Prior to conducting statistical analyses, all study variables were examined for accuracy of data by conducting univariate descriptive statistics. Out-of-range values, implausible responses and univariate outliers were taken into account and corrected by reassessing the raw data. The expectation maximization (EM) method was used to impute missing values into the data since SPSS Missing Values Analysis (MVA) showed that all study variables had less than a 5% of missing data.

Total scores for 3 composite dependent variable scales were calculated including PTSD symptoms (i.e., the PCL-C), alcohol risk scores (i.e., the AUDIT), and alcohol-related problems (i.e., the RAPI). Since the distributions of all three of these variables were significantly skewed, logarithm transformations of them were completed, significantly reducing the skewness of the final distribution. Likewise, two scales from the DDQ, Mean Weekly Drinks and Mean Weekly Hours, were comparably skewed and transformed.

*Data Reduction.* It is customary to perform data reduction analyses on Brief Cope scales in order to determine if the multiple subscales reduce to smaller number of core coping dimensions. To do so, a factor analysis of the 14 Brief Cope subscales was performed. Specifically, principal axis factoring along with examination of scree plots and initial Eigenvalues revealed three factors, all with eigenvalues greater than 1.0 and accounting for 60.65% of the variance in the matrix. Rotation to simple structure using an oblimin rotation revealed that Factor 1 consisted of the Acceptance, Positive Reframing, Planning, Humor, and Active Coping Subscales. This factor was labeled Approach Coping. Factor 2 consisted of the Behavioral Disengagement, Denial, Self-Blame, and Substance Use subscales and was labeled Maladaptive Coping. Finally, Factor 3 consisted of the Instrumental Social Support, Emotional Social Support, and the Religion subscales and was labeled Support Coping. Two subscales,
Self-Distraction and Venting, did not load clearly on any single factor and were eliminated from further consideration. Subscales for these three factors were created by averaging across the subscales that created each factor. Because this study also had a particular interest in Substance Use Coping, the subscale was examined both as a part of the Maladaptive Coping Subscale and as its own unique method of coping.

Descriptive analyses. Table 1 presents demographics for the study population. As shown, the mean age for the population was nearly 38 years and it was predominantly male and Hispanic. About 2/3 of firefighters were married; and 1/3 were single. In terms of rank, ¼ of firefighters were officers; and ¾ were uniformed firefighters or drivers.

Table 1

Descriptive Statistics for the Sample Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD) or %</th>
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<tr>
<td>Age</td>
<td>37.67 (8.07)</td>
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<tr>
<td>Gender</td>
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</tr>
<tr>
<td>% Male</td>
<td>98.1%</td>
</tr>
<tr>
<td>% Female</td>
<td>1.9%</td>
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<tr>
<td>Hispanic</td>
<td>75.5%</td>
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<tr>
<td>Marital Status</td>
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<tr>
<td>Single</td>
<td>32.6%</td>
</tr>
<tr>
<td>Married</td>
<td>67.4%</td>
</tr>
<tr>
<td>Rank</td>
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</tr>
<tr>
<td>Officer</td>
<td>27.0%</td>
</tr>
<tr>
<td>Non-Officer</td>
<td>73.0%</td>
</tr>
</tbody>
</table>

Note: N = 740; Marital Status: Single includes divorced, widowed, separated, never married/single, cohabitating, or other; Rank: Officer includes Lieutenant, Captain, and Chief.
Means, standard deviations, and scale alphas for all measures are presented in Table 2. As shown, scale alphas were acceptable, ranging from .70 to .92. Mean scores on the PCL-C were higher than other firefighter samples (27.6 vs. 23.8; respectively; Del Ben, Scotti, Chen, & Fortson, 2006). About 85.7% of the firefighters reported at least some experience of PTSD symptoms, and 8.5% scored above a recommended civilian cutoff score of 44 (Blanchard et al., 1993).

The average AUDIT score, which indicates At-Risk Drinking, was 6.26. A total of 26% (n = 195) scored between 8 and 15, a standard cutoff score indicating need for simple advice (Babor et al., 2001); 3.9% (n = 29) scored between 16 and 19, a score indicating need for simple advice plus counseling and monitoring, and 2.4% (n = 18) scored 20 or greater, a cutoff score indicating need for referral to a specialist for evaluation and treatment. Thus, based on this screening instrument, a total 32.7% of firefighters could use some level of alcohol-related intervention. The average score for Alcohol-Related Problems (i.e., RAPI) was 2.83. A total of 46.6% (n = 345) reported experiencing at least one alcohol-related problem in the last three months. These numbers are similar to those seen in college populations (Tomaka, Palacios, Monks, & Thompson, 2012).

Regarding Alcohol Consumption as assessed by the modified DDQ, firefighters reported drinking on approximately 2 (range 0-7) days a week, for an average of 7 hours (range 0-59), and consuming an average of 10 (range 0-70) drinks during a typical week. The top motives for drinking were for enhancement and for sociability, followed by coping and conformity. Firefighters reported using more approach coping strategies than maladaptive and support coping.

Table 2 also shows the intercorrelations of the measures used in this study. As shown, given the size of the sample, most correlations were significant. The PCL-C was unrelated to age and rank, suggesting it affected firefighters of all ages. Relevant to the present study, and as predicted, PCL-C measure of PTSD symptoms correlated positively with At-Risk Drinking ($r =$
. 18), Alcohol-Related Problems \((r = .33)\), and measures of Alcohol Consumption \((r = .09, \ r = .11, \text{ and } r = .10)\), for Average Weekly Drinking Days, Average Weekly Drinks, and Average Weekly Drinking Hours; respectively). Interestingly, the correlations with consumption were smaller than the correlation with problems, with the correlation with At-Risk Drinking, which has items assessing both consumption and problems, falling in between. The PCL-C also correlated positively with the measures of drinking motives and the coping scales.
Table 2

Means, Standard Deviations, Scale Alphas, and Intercorrelations Among Primary Study Variables

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<td>-.20**</td>
<td>-.19**</td>
<td>-.06</td>
<td>-.15**</td>
<td>-.12**</td>
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<td>-.18**</td>
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<td>-.14**</td>
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<td>-.08*</td>
<td>-.03</td>
<td>-.07*</td>
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<td>-.05</td>
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<td>.45**</td>
<td>.48**</td>
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<td>6. DDQ Average Weekly Drinking Days</td>
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<td>.40**</td>
<td>.41**</td>
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<td>.17**</td>
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<td>7. DDQ Average Weekly Drinks</td>
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<td>.45**</td>
<td>.62**</td>
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<td>8. DDQ Average Weekly Drinking Hours</td>
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<td>.57**</td>
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<td>.16**</td>
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<td>.19**</td>
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<td>Mean</td>
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<td>6.26</td>
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<td>.75</td>
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Note: *p<.05; **p<.01
Regression, Path, and Structural Analyses

All regression, path, and structural models were examined using SPSS AMOS 19.0. Specifically a series of hypothesized models examined relationships between PTSD symptoms and Alcohol Risk Levels, as assessed by the AUDIT, Alcohol-Related Problems, as assessed by the RAPI, and Alcohol Consumption, as assessed by the DDQ. These models also tested mediation of this relationship by Drinking Motives including Enhancement, Social, Drinking to Cope, and Conformity, as well as Coping Strategies including Maladaptive Coping, Approach Coping, Support Coping, and the specific coping strategy of Substance Use Coping. All structural analyses used Alcohol Consumption modeled as a latent variable with the three DDQ items (Days, Hours, and Weekly Drinks) as indicators. Confidence intervals for all estimates were calculated using bootstrap methods with 5000 bootstrap samples.

The first analyses examined PTSD as a predictor of At-Risk Drinking, Alcohol-Related Problems and Alcohol Consumption. These analyses are shown in Figure 3. As shown, the PTSD Symptoms were significantly associated with At-Risk Drinking scores and accounted for 3% of the variance in such scores. The Critical Ratio [CR] for the beta coefficient of .18, [95% CI: .11, .25] was 4.93, p < .001. PTSD Symptoms were also significantly associated with Alcohol-Related Problem scores and accounted for 11% of the variance in such scores. The CR for the beta coefficient of .33, [95% CI: .26, .40] was = 9.40, p < .001. Finally, the PTSD Symptoms were significantly associated with Alcohol Consumption scores and accounted for 1% of the variance in such scores. The CR for the beta coefficient of .11, [95% CI: .03, .11] was 2.86, p < .01.
Figure 3. Regression analyses relating PTSD Symptoms (PCL-C) to Alcohol Risk Levels (AUDIT), Alcohol-Related Problems (RAPI), and Alcohol Consumption (DDQ).

Path and Structural Analyses for Drinking Motives

Three specific models examined drinking motives as mediators of the relationships above, including one each for At-Risk Drinking, Alcohol-Related Problems, and Alcohol
Consumption. Each of these models used PTSD symptoms as the sole exogenous variable and the four drinking motives as potential mediators. These models are shown in Figures 4-6. As shown across the three models, PTSD symptoms were significantly related to drinking for enhancement, drinking to cope, and drinking to conform; however, PTSD symptoms did not relate to drinking to be social.

As shown in Figure 4, At-Risk Drinking (i.e., AUDIT scores) was predicted by all four motives including drinking for enhancement, drinking to be social, drinking to cope, and drinking to conform. Tests of the indirect effects, which provide evidence of statistical mediation, were significant for drinking for enhancement (.05, p < .001), drinking to cope (.03, p < .001) and conformity (-.02, p < .05). Overall, the model accounted for 51% of the variance in At-Risk Drinking and provided a good fit to the data (Comparative Fit Index [CFI] = 1.00; Root Mean Square Error of Approximation [RMSEA] = .019). These results suggest that people with PTSD symptoms drink for a number of reasons, particularly for enhancement, to cope, and to conform. In addition, all three of these motives showed evidence of mediating the effect of PTSD symptoms on At-Risk Drinking. In contrast, PTSD symptoms were unrelated to drinking for social reasons, and this motive did not mediate the effect of PTSD symptoms on At-Risk Drinking. Overall, inclusion of the set of mediators left no need to include a residual relationship between PTSD Symptoms and At-Risk drinking (i.e., complete mediation; Baron & Kenny, 1986).
Figure 4. Results of mediating effect of Drinking Motives (DMQ-R) on PTSD Symptoms (PCL-C) and At-Risk Drinking (AUDIT).

As shown in Figure 5, Alcohol-Related Problems (i.e., RAPI scores) were predicted by three of the four motives including drinking for enhancement, drinking to be social, and drinking to cope, but not drinking to conform. Tests of the indirect effects, which provide evidence of statistical mediation, were significant for drinking for enhancement (.04, p < .001), and drinking to cope (.06, p < .001). Overall, the model accounted for 39% of the variance in Alcohol-Related Problems and provided a good fit to the data (CFI = 1.00; RMSEA = .00). These results suggest
that drinking for enhancement and drinking to cope mediate the effect of PTSD symptoms on Alcohol-Related Problems. In contrast, drinking for social reasons and drinking to conform did not mediate this effect. Overall, and unlike the previous model, the set of mediators did not completely account for the relationship between PTSD Symptoms and Alcohol-Related Problems, leaving a significant residual relationship of .12 (p < .05).

Figure 5. Results of mediating effect of Drinking Motives (DMQ-R) on PTSD Symptoms (PCL-C) and Alcohol-Related Problems (RAPI).
As shown in Figure 6, Alcohol Consumption (i.e., DDQ scores) was predicted by all four motives including drinking for enhancement, drinking to be social, drinking to cope, and drinking to conform; however, drinking to conform was inversely related to Alcohol Consumption. Tests of the indirect effects, which provide evidence of statistical mediation, were significant for drinking for enhancement (.05, p < .001), drinking to cope (.04, p < .001), and drinking to conform (-.03, p = .001). Overall, the model accounted for 44% of the variance in Alcohol Consumption and provided a good fit to the data (CFI = .991; RMSEA = .072). Unlike the previous two models, this model retained a significant residual association between PTSD symptoms and Alcohol Consumption. Interestingly, this association changed from a significant positive association (b = .11) to a significant negative association (b = -.08, p < .05), after accounting for drinking motives. Overall, these results suggest that all three of these reasons mediate the effect of PTSD symptoms on Alcohol Consumption. As above, PTSD symptoms were unrelated to drinking for social reasons; and this motive did not mediate the effect of PTSD symptoms on Alcohol Consumption. Overall, the set of mediators did not completely account for the relationship of PTSD Symptoms and Alcohol Consumption, leaving a significant residual relationship of -.08, (p < .05).
Figure 6. Results of mediating effect of Drinking Motives (DMQ-R) on PTSD Symptoms (PCL-C) and Alcohol Consumption (DDQ-M).

Path and Structural Analyses for Coping

Parallel analyses examined coping strategies. Again, three specific models were examined with regard to coping strategies including one for At-Risk Drinking, one for Alcohol-Related Problems, and one for Alcohol Consumption (as a latent variable). Each of these models used PTSD symptoms as the sole exogenous variable and coping strategies as potential mediators including approach coping, maladaptive coping, support coping, and
substance use coping. These models are shown in Figures 7-9. As shown across the three models, PTSD symptoms were significantly related to approach coping, maladaptive coping, and substance use coping; however, PTSD symptoms did not relate to support coping.

As shown in Figure 7, At-Risk Drinking (i.e., AUDIT scores) was predicted by three of the four coping strategies including approach coping, support coping, and substance use coping, but not maladaptive coping. Tests of the indirect effects, which provide evidence of statistical mediation, were significant only for approach coping (.05, p < .001) and substance use coping, (.15, p < .001). Overall, the model accounted for 19% of the variance in At-Risk Drinking and provided a good fit to the data (CFI = 1.00; RMSEA = .000). These results suggest that people with PTSD symptoms rely more on approach forms of coping, maladaptive forms of coping, and substance use coping than people low in such symptoms. However, only use of approach coping and substance use coping mediated the effect of PTSD symptoms on At-Risk Drinking. In contrast, PTSD symptoms were unrelated to using support coping and maladaptive coping was unrelated to At-Risk Drinking. Therefore, these two movies could not mediate the effect of PTSD symptoms and At-Risk Drinking. Overall, inclusion of the set of mediators left no need to include a residual relationship between PTSD Symptoms and At-Risk drinking (i.e., complete mediation; Baron & Kenny, 1986).
As shown in Figure 8, Alcohol-Related Problems (i.e., RAPI scores) were predicted by three of the four coping strategies including approach coping, support coping, and substance use coping, but not maladaptive coping. Tests of the indirect effects, which provide evidence of statistical mediation, were significant for approach coping (.03, p < .05), and substance use coping (.17, p < .001). Overall, the model accounted for 26% of the variance in Alcohol-Related Problems and provided a good fit to the data ([CFI] = 1.00; [RMSEA] = .000). These results
suggest that only approach coping and substance use coping mediated the effect of PTSD symptoms on Alcohol-Related Problems. In contrast and as described above, support coping and maladaptive coping did not mediate the effect of PTSD symptoms and Alcohol-Related Problems. Overall, the set of mediators did not completely account for the relationship of PTSD Symptoms and Alcohol-Related Problems, leaving a significant residual relationship of .16, (p < .05).
Figure 8. Results of mediating effect of Coping Strategies (Brief Cope) on PTSD Symptoms (PCL-C) and Alcohol-Related Problems (RAPI).

As shown in Figure 9, Alcohol Consumption (i.e., DDQ scores) was predicted by three of the four coping strategies including approach coping, support coping, and substance use coping, but not maladaptive coping. Tests of the indirect effects, which provide evidence of statistical mediation, were significant only for approach coping (.03, p < .01), and substance use coping (.16, p < .001). Overall, the model accounted for 17% of the variance in Alcohol Consumption and provided a good fit to the data (CFI = .998; RMSEA = .034). As above, these results suggest that approach coping and substance use coping mediated the effect of PTSD symptoms on Alcohol Consumption. In contrast, support coping and maladaptive coping did not mediate the effect of PTSD symptoms and Alcohol Consumption. Overall, and unlike the previous model, inclusion of the set of mediators left no need to include a residual relationship between PTSD Symptoms and Alcohol Consumption (i.e., complete mediation; Baron & Kenny, 1986).
Figure 9. Results of mediating effect of Coping Strategies (Brief Cope) on PTSD Symptoms (PCL-C) and Alcohol Consumption (DDQ-M).

**Unified Path and Structural Models Combining Drinking Motives and Coping**

The final set of analyses examined unified models that integrated drinking motives and coping strategies for each alcohol-related outcome. Initial models included drinking motives and coping strategies that showed evidence of mediation in their separate analyses. As such, social motives, maladaptive coping, and support coping were eliminated from the unified models a priori. Additional constructs were deleted in subsequent models if they failed to show significant
mediational associations. This resulted in the elimination of drinking for enhancement and approach coping from all models. In addition, and as described below, drinking to conform failed the test of mediation for only the alcohol consumption model. The final models are shown in Figures 10-12.

As shown in Figure 10, At-Risk Drinking was predicted by drinking to cope, drinking to conform, and substance use coping. Tests of the indirect effects, which provide evidence of statistical mediation, were significant for all three scales including drinking to cope (.04, p = .001), drinking to conform (.02, p < .05), and substance use coping (.07, p < .001). Overall, the model accounted for 26% of the variance in At-Risk Drinking and provides a good fit to the data (CFI = .995; RMSEA = .081). These results suggest drinking to cope, drinking to conform, and substance use coping independently mediated the effect of PTSD symptoms on At-Risk Drinking. Overall, the set of mediators did not completely account for the relationship of PTSD Symptoms and At-Risk Drinking, leaving a significant residual relationship of -.07, (p < .05).
Figure 10. Unified model illustrating mediating effect of Drinking to Cope and Conformity Motives and Substance Use Coping on PTSD Symptoms (PCL-C) and At-Risk Drinking (AUDIT).

As shown in Figure 11, Alcohol-Related Problems were predicted by drinking to cope, drinking to conform, and substance use coping. Tests of the indirect effects, which provide evidence of statistical mediation, were significant for all three scales including drinking to cope (.04, p < .001), drinking to conform (.03, p < .01), and substance use coping (.09, p < .001).

Overall, the model accounted for 34% of the variance in Alcohol-Related Problems and provides a good fit to the data (CFI = .995; RMSEA = .081). As above, these results suggest that these three scales independently mediated the effect of PTSD symptoms on Alcohol-Related Problems. Overall, and similar to the previous model, the set of mediators did not completely account for the relationship of PTSD Symptoms and Alcohol-Related Problems, leaving a significant residual relationship of .07, (p < .05).
Figure 11. Unified model illustrating mediating effect of Drinking to Cope and Conformity Motives and Substance Use Coping on PTSD Symptoms (PCL-C) and Alcohol-Related Problems (RAPI).

As shown in Figure 12, Alcohol Consumption was predicted by drinking to cope and substance use coping, but not drinking to conform. Tests of the indirect effects, which provide evidence of statistical mediation, were significant for drinking to cope (.05, p = .001) and substance use coping (.06, p < .001), but not significant for drinking to conform (p > .05). Overall, the model accounted for 23% of the variance in Alcohol Consumption and provides a good fit to the model ([CFI] = .995; [RMSEA] = .052). These results suggest that only drinking to cope and substance use coping independently mediate the effect of PTSD symptoms on Alcohol Consumption. Overall, the set of mediators did not completely account for the
relationship of PTSD Symptoms and Alcohol-Related Problems, leaving a significant residual relationship of -.12, (p < .05).

*Figure 12.* Unified model illustrating mediating effect of Drinking to Cope and Conformity Motives and Substance Use Coping on PTSD Symptoms (PCL-C) and Alcohol Consumption (DDQ-M).
CHAPTER 4: DISCUSSION

This study examined PTSD symptoms and their relationship with At-Risk Drinking, Alcohol-Related Outcomes and Alcohol Consumption among El Paso firefighters. Additionally, the study examined drinking motives and coping strategies employed by firefighters, specifically Drinking to Cope and Substance Use coping, as possible explanations for the associations between PTSD symptoms and alcohol-related outcomes. In general, it was hypothesized that report of PTSD symptoms would positively relate to alcohol use and related outcomes, and that drinking motives and coping strategies would mediate these effects.

Overall, this study found relatively strong support for the hypotheses. Specifically, PTSD was related to all outcome measures including At-Risk Drinking, Alcohol-Related Problems and Alcohol Consumption. These relationships were not equally strong however, as PTSD was most strongly related to Alcohol-Related Problems and least strongly related to Alcohol Consumption, with At-Risk Drinking scores falling in between. This suggests that firefighters with PTSD, while consuming only slightly higher levels, are considerably more likely to experience alcohol-related problems when they are consuming.

The mediational analyses also supported the hypotheses. Specifically, results indicated that drinking motives and coping strategies mediated the effect of PTSD symptoms on all alcohol-related outcomes. In regard to drinking motives, Enhancement, Drinking to Cope, and Conformity motives all mediated this relationship; Social motives did not. The pattern of mediation was different, however, for the three motives. For Drinking for Enhancement and Drinking to Cope, the results showed both motives to mediate the effect on all alcohol-related measures. These findings suggest that firefighters experiencing PTSD symptoms drink in order to enhance emotional states and to cope with symptoms, consequently leading to At-Risk Drinking, Alcohol-Related Problems and Alcohol Consumption. However, the pattern for conformity motives was different. Specifically, conformity motives showed no significant association with Alcohol-Related Problems and were inversely related to At-Risk Drinking and
Alcohol Consumption. According to these findings, it can be implied that those with PTSD symptoms who drink to conform drink less than those drinking for other motives and are involved in less At-Risk Drinking. Additionally, those drinking for enhancement and for coping motives experience more Alcohol-Related Problems than those drinking for conformity motives.

In regards to coping, firefighters with PTSD symptoms were more likely to report use of Approach Coping, Maladaptive Coping, and the specific strategy of Substance Use Coping, but not greater use of Support Coping. Only Approach Coping and Substance Use coping, however, demonstrated significant mediation of the effect of PTSD symptoms on At-Risk Drinking, Alcohol-Related Problems and Alcohol Consumption. These findings suggest that firefighters with PTSD symptoms use approach and maladaptive strategies to cope with stress, and that the use of both is associated with greater alcohol outcomes. These findings suggest that, among those suffering from PTSD symptoms, the overall need to cope (in approach or maladaptive ways) is generally associated with alcohol misuse and the use of approach coping strategies is not leading to a positive outcome in this particular context (i.e., those using Approach Coping are not decreasing their alcohol use as might be expected).

Finally the combined models showed that firefighters with PTSD symptoms drink for coping and conformity motives, and also engage in substance use coping strategies. These three factors mediated the relationship between PTSD symptoms and At-Risk Drinking, Alcohol-Related Problems and Alcohol Consumption. However, in the combined models, conformity motives had a different mediational effect on alcohol-related outcomes. The combined models show conformity motives to be significantly associated with At-Risk Drinking and Alcohol-Related Problems, yet there was no significant association in Alcohol Consumption. These models suggest that those with PTSD symptoms, who drink to cope and who engage in substance use are involved in At-Risk Drinking, experience Alcohol-Related Problems and increase Alcohol Consumption. Instead, those that drink to conform tend to be involved in At-
Risk Drinking and experience Alcohol-Related Problems; but do not necessarily increase their Alcohol Consumption.

Overall, these results suggest PTSD symptoms are significantly associated with alcohol outcomes and particularly with the experience of problems stemming from such use. Moreover, they suggest that the factors motivating drinking behavior, and the ways that they tend to cope with the stress in their lives, partially or totally account for the associations between the experience of PTSD symptoms and alcohol-related outcomes.

This study also revealed several other interesting findings. For example, the majority of firefighters reported experiencing PTSD symptoms at some level and about 8.5% scored above a standard cutoff point of 44. This is consistent with Del Ben et al. (2006), who reported approximately 8% of their U.S. firefighter sample meeting a cut off point of 44. When comparing mean values of PTSD scores, the present study had very similar results to those of Farnsworth & Sewell (2011) who examined a group of firefighters in southeastern U.S. (27.36, vs. 26.57; respectively). Comparably, the present study reported a slightly higher mean of PTSD scores when compared to those of Del Ben et al. (2006), who evaluated a group of firefighters from two U.S. states. These rates may be attributed to the numerous sources of occupational stress firefighters sustain (Murphy et al., 1999) such as the frequent exposure of traumatic events.

In terms of their drinking patterns, firefighters’ consumption patterns are strikingly similar to college students (Tomaka et al., 2012; Schaus, Sole, McCoy, Mullet, & O’Brien, 2009). However, according to previous research, firefighters tend to have more problems with alcohol use or abuse, double of that of the general population (Bacharach et al., 2008) and more than seen in a recent study of college students from the same city (Tomaka et al., 2012). However, other studies on college students reported to have higher Alcohol-Related Problems than the current firefighter population (Schaus et al., 2009). So, although consumption patterns for firefighters mirror college student samples, it is uncertain whether they experience more or less problems than such samples.
A second interesting finding was that roughly one third of firefighters experienced At-Risk Drinking at some level and could benefit from an alcohol-level intervention. This figure is not surprising in light of other research. As stated by Bacharach et al. (2008), about 30% of U.S. firefighters have possible problems with alcohol use or abuse. By way of explanation, an alcohol-intervention is necessary, particularly to those “at risk” of possible problems with alcohol use, in order to prevent and reduce harmful alcohol-related outcomes. The majority of firefighters considered being “at-risk” fall in the score range of 8-15, which is recommended to receive simple advice and educational materials (Barbor et al., 2001). However, the remaining firefighters are in need of more intensive interventions such as simple advice in addition to brief counseling and continued monitoring to manage harmful and hazardous drinking, or a referral to a specialist for diagnostic evaluation and possible treatment for alcohol dependence (Barbor et al., 2001).

Despite the large number of firefighters engaging in At-Risk Drinking, on average, firefighters drank within the recommended weekly drinking limits, that is, no more than 14 drinks per week for males, and no more than 7 drinks per week for females (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2012). However, almost half of the firefighter population, regardless of level of PTSD, reported experiencing problems within the past three months due to their drinking. These findings indicate that although firefighters drink more than an average working citizen and similar to college student populations, they have more difficulties with managing their alcohol intake consequently leading them to more Alcohol-Related Problems.

This study also provided knowledge on the reasons why firefighters drink, that is, their drinking motives. Specifically, the data suggest that this particular population drinks alcohol for mainly social facilitation and enhancement motives; however, drinking to cope and to conform were still common among this group. When examining drinking motives among those experiencing PTSD symptoms, there is a stronger association with enhancement, drinking to
cope, and conformity motives, but a weak association is found with social motives. Moreover, drinking to conform was negatively associated with At-Risk Drinking and Alcohol-Related Problems. The current population of firefighters reported higher drinking to cope means scores than other samples of firefighters (Bacharach et al., 2008). Overall, the results were consistent with the Self-Medication Hypothesis; firefighters with PTSD symptoms may perceive alcohol as means to relieve such symptoms, however, this motivation can lead to negative alcohol-related outcomes.

This study also found that all types of coping strategies were used by firefighters including approach coping, social support coping, maladaptive coping, and substance use coping, with the most prevalent (i.e., highest mean levels) being approach and social support coping. These strategies also showed different relationships to PTSD symptoms, with PTSD symptoms being associated with approach, maladaptive, and substance use coping, but less strongly to support coping. Not surprisingly, substance use coping is considered ineffective as means to deal with stress, including PTSD symptoms, and use of this strategy was predictably associated with negative outcomes. Interestingly, although approach coping is usually considered adaptive or beneficial, it led to negative outcomes in this sample and study. This suggests that those employing approach coping are not decreasing their alcohol use and negative related outcomes.

The lack of association between PTSD and Social Support coping is also noteworthy because use of such coping appears to be protective regarding negative alcohol-related outcomes. As such, firefighters should use more social support coping with other firefighters, friends and family members in order to decrease stress (Chamberlin & Green, 2011).

Interestingly, some results were unexpected. The use of maladaptive coping was expected to have significant effect on alcohol use and related outcomes; but was found otherwise. This may be due to the majority of firefighters using a substance use coping approach (which was also examined individually from the maladaptive coping factor) rather than
other types of maladaptive coping including behavioral disengagement, denial, and self-blame. Indeed, once substance use was statistically controlled in the models, maladaptive coping was negatively related to alcohol consumption and problems. This suggests that substance use was the main coping strategy used by firefighters in this study and accounted for the majority of negative alcohol-related outcomes.

Also, it was anticipated that firefighters with PTSD symptoms would engage more in seeking support from others, being that firefighters have a close firefighter network, providing a strong sense of “brotherhood”. However, this was not the case. A reason for this may be that, despite the feelings of “brotherhood”, firefighters find it more challenging to discuss or disclose personal feelings or information in a manner that would be consistent with social support.

Lastly, it was predicted that older firefighters, along with higher rank, would experience more psychological distress due to higher exposure of traumatic events; yet no association between PTSD symptoms and age and rank was found. Specific reasons for these findings may be that older firefighters have become desensitized to exposure to traumatic events. Alternatively, firefighters with higher rank may have more distance to traumatic event exposure due to their supervisory roles. Similarly, firefighters who are strongly affected by such events may leave the profession or retire, self-selecting out of the older sample.

Consistent with expectancies, those with PTSD symptoms drink for coping reasons, which is what the literature supports (Stewart, Mitchell, Wright, & Loba, 2004). Additionally, it was anticipated that firefighters with PTSD symptoms would not mainly drink for social reasons since drinking is mainly motivated by a need of symptom relief. However, this self-medication behavior leads to continuation or intensification of PTSD symptoms on a long-term basis, which motivates individuals to continue using alcohol to cope with such symptoms (Stewart et al., 2004).

Finally, the data provided strong support for the two theories used to explore associations between PTSD and alcohol outcomes. Indeed, both theories, including Lazarus
and Folkman’s Stress and Coping theory (Lazarus & Folkman, 1984) and the Self-Medication Hypothesis (Khantzian, 1985), were supported by the findings. Both theories demonstrated to be good models of behaviors among those experiencing PTSD symptoms and are inclined to drink to cope and/or aim to alleviate distressful emotions. Firefighters demonstrated to neglect using more positive coping strategies, and instead engage in coping-motivated drinking. Consistently, these theories helped explain the relationship between PTSD symptoms and alcohol use among this unique population.

**Consistency with Past Research**

Consistent with the literature, firefighters had a higher prevalence of PTSD symptoms than the general population. Overall, our findings indicate that the EPFD population reported experiencing more PTSD symptoms (i.e., higher mean level) than the average found in other U.S. fire departments (Del Ben et al., 2006). However, different measures and a variety of cut off points used in previous studies need to be taken into account when comparing PTSD prevalence among populations. Specifically, when using a cut off point of 44 in the PCL-C, our findings are consistent with those of Del Ben et al., (2006).

Also consistent with the literature, there was an association between PTSD symptoms and an increase in alcohol use (Stewart, 1996). About 90% of El Paso firefighters reported to be current drinkers, a figure higher when compared to other firefighter samples (Murphy et al., 2002). Yet, firefighters’ drinking patterns were somewhat similar with those found by Murphy et al. (2002). El Paso firefighters drink the same number of days during a typical week, but consume a greater number of drinks per drinking occasion. Additionally, our findings revealed that approximately 33% of firefighters could use some level of alcohol intervention, suggesting possible problems with alcohol use among this population. Boxer & Wild (1993) and Bacharach et al. (2008) report about 30% of firefighters with possible problems with alcohol use, a comparable amount to our findings. Finally, this relationship was also consistent with our theories that firefighters are using alcohol to cope with their stress or they are using alcohol as a
self-medication approach to deal with PTSD symptoms. Stewart et al. (2004) also found that the relations of PTSD symptoms and alcohol use were strong due to coping motives for drinking, as well as drinking to forget re-experiencing symptoms and ease hyper arousal. Also, Stewart et al. (2004) found similar observations in their sample of rescue workers, which suggest that drinking behavior was motived due to a need for self-medication.

**Implications for Prevention and Treatment**

Due to the frequent exposure of stressful situations among fire departments, prevention and intervention strategies for stress-related outcomes should be a main focus for this particular population. Interventions designed to prevent or reduce PTSD symptoms due to daily exposure to disaster may also be efficient in preventing alcohol-related outcomes and decreasing alcohol consumption. The fire department may benefit from assessment and treatment of PTSD symptoms including referral and counseling for alcohol consumption and related problems.

In particular, the results of this research indicate that prevention efforts should focus on an overall stress-reduction approach for this particular population. Our results indicate that both approach and maladaptive forms of coping are leading to alcohol misuse. Thus, implementing a general approach may be more effective than the teaching of specific types of coping. A possible explanation for the association of approach coping and alcohol misuse is that firefighters may not be employing positive coping strategies properly, such as seeking instrumental or social support. Informing firefighters on the availability of instrumental and social support may be beneficial for this particular population.

Research shows that seeking instrumental or practical support from others is found to predict lower PTSD symptoms (Chamberlin & Green, 2010), and this seems to be a less prominent coping strategy among El Paso firefighters. Emphasizing the importance of support coping, i.e., instrumental support, emotional social support, and religion, and facilitating reduction of maladaptive coping strategies, e.g., substance use, may reduce the onset or severity of PTSD symptoms. Moreover, literature shows that those who drink for enhancement
or coping motives (which is the majority of this population) incline to drink heavier and are more involved in alcohol-related problems. These findings provide insight on the importance of alcohol-related interventions among firefighters. This new gained knowledge can support the Center for Employee Assistance to increase employee awareness of approach coping strategies through outreach activities, workshops, trainings, or individual sessions.

**Strengths and Limitations**

When interpreting results from this study, certain limitations need to be addressed. First, as a cross-sectional study, it does not allow us to make causal inferences, that is, it is not possible to differentiate whether exposure to PTSD symptoms appeared before or after alcohol-related outcomes. Second, instruments were based on self-report, which can result in misclassification and reporting concerns. Third, since this was a population of El Paso firefighters, it is not necessarily representative of other fire departments in the U.S. Lastly, conspiracy theories were present during the study. Several firefighters expressed concerns regarding retaliation among the fire department if health assessment packets were answered honestly. A consequence of this might be that firefighters may not be answering truthfully due to their fear of being identified with their responses.

Conversely, a main strength in this study is a very robust sample that was obtained, which measures the EPFD population. A total of 740 participants were obtained out of a total of 844 El Paso firefighters. Furthermore, participation from firefighters was able to be attained, thus promoting community participation.

**Directions for Future Research**

Several approaches are recommended for future research. The first would be more longitudinal investigations. The fire personnel can be best examined over a period of time. Future studies focusing on rescue workers and other populations who are frequently exposed to trauma could be better assessed using longitudinal study designs. Doing so will allow us to
better model presumed causal relationships, e.g., if PTSD symptoms preceded alcohol use and related outcomes, or vice versa.

Likewise, there is a need of studies with a focus on interventions for individuals experiencing PTSD symptoms, trauma, and coping with trauma experienced on a daily basis. This is knowledge that would benefit firefighters and other populations such as combatants or war veterans. Additionally, future studies should aim their efforts at implementing alcohol-related interventions since this population is highly involved in alcohol-related outcomes. Moreover, integrating cognitive appraisal when examining PTSD symptoms among those frequently exposed to traumatic events may be an interesting perspective to assess. Those who perceive a situation negatively to the environment or to their well being may be at higher risk of developing PTSD symptoms. If so, interventions should target those with a negative cognitive state in order to prevent the onset of PTSD symptoms.

Summary and Conclusions

Based on study findings, firefighters are at high risk for the development of PTSD. A large number of firefighters were found to experience some level of PTSD symptoms. Those with PTSD symptoms drink mainly to cope and to conform, and engage in substance use as a coping strategy. Consequently, firefighters are involved in At-Risk Drinking, which puts them at risk for possible problems with alcohol use. Even though their drinking patterns may be somewhat similar to those of other populations, e.g., college students, they are involved in more Alcohol-Related Problems.

In conclusion, there needs to be an increase in awareness of the firefighting profession and its stress-related effects. Efficient programs or interventions for PTSD symptomology, alcohol consumption and coping strategies are areas that need to be considered a principal necessity. There needs to be an increase in support for firefighters to handle experienced trauma and the stress that comes with it. Education and promotion of positive and effective coping strategies, e.g. social support, is beneficial for this population. Also, it is important to
promote how to better manage alcohol consumption and safety in order to reduce alcohol-related problems that this population highly experiences.
REFERENCES


Beaton, R., Murphy, S., Johnson, C., Pike, K., & Corneil, W. Coping responses and posttraumatic stress in urban fire service personnel. *Journal of Traumatic Stress, 12* (2), 293-308.


APPENDIX

Demographics

1. What is your age?
   ______ (years)

2. Are you Hispanic or Latino?
   □ Yes
   □ No

3. Which one of these groups would you say best represents your race?
   □ White
   □ Black or African American
   □ Asian
   □ Native Hawaiian or Other Pacific Islander
   □ American Indian or Alaska Native
   □ Other [specify] __________________

4. Are you currently?
   □ Married
   □ Divorced
   □ Widowed
   □ Separated
   □ Never married/Single
   □ Cohabiting
   □ Other

5. What is your sex?
   □ Male
   □ Female

6. Approximately, how long have you been a firefighter?
   ______ (years)
   ______ (months)

7. What is your rank?
   □ Firefighter
   □ Driver
   □ Lieutenant
   □ Captain
   □ Chief

8. What is your current shift assignment?
   □ A
   □ B
   □ C
**AUDIT**

The following questions are about the last 3 months:

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<th>1. How often do you have a drink containing alcohol?</th>
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<th>2. How many drinks of alcohol do you have on a typical day when you are drinking?</th>
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<th>3. How often do you have six or more drinks on one occasion?</th>
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<th>4. How often during the last 3 months have you found that you were not able to stop drinking once you had started?</th>
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<th>5. How often during the last 3 months have you failed to do what was normally expected from you because of drinking?</th>
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<th>6. How often during the last 3 months have you needed a first drink in the morning to get yourself going after a heavy drinking session?</th>
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<th>7. How often during the last 3 months have you had a feeling of guilt or remorse after drinking?</th>
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<th>8. How often during the last 3 months have you been unable to remember what happened the night before because you had been drinking?</th>
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<th>9. Have you or has someone else been injured as a result of your drinking?</th>
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<th>10. Has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?</th>
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**RAPI**

How many times did the following things happen to you while you were drinking alcohol or because of your alcohol use during the last three months?

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<th>No.</th>
<th>Question</th>
<th>Never</th>
<th>1-2</th>
<th>3-5</th>
<th>6-10</th>
<th>10+</th>
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<td>1.</td>
<td><em>In the last three months, how often have you</em> felt that you not able to do your homework or study for a test?</td>
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<td>☐</td>
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<td>2.</td>
<td><em>In the last three months, how often have you</em> got into fights, acted bad or did mean things with other people (friends, relatives, strangers)?</td>
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<td>3.</td>
<td><em>In the last three months, how often have you</em> missed out on other things because you spent too much money on alcohol?</td>
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<td>4.</td>
<td><em>In the last three months, how often have you</em> went to work or school high or drunk?</td>
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<td>☐</td>
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<td>5.</td>
<td><em>In the last three months, how often have you</em> caused shame or embarrassment to someone?</td>
<td>☐</td>
<td>☐</td>
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<td>6.</td>
<td><em>In the last three months, how often have you</em> neglected your responsibilities?</td>
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<td>7.</td>
<td><em>In the last three months, how often have you</em> relatives avoided you?</td>
<td>☐</td>
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<tr>
<td>8.</td>
<td><em>In the last three months, how often have you</em> felt that you needed more alcohol than you used to use in order to get the same effect?</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>9.</td>
<td><em>In the last three months, how often have you</em> tried to control your drinking by trying to drink only at certain times of the day or certain places?</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>10.</td>
<td><em>In the last three months, how often have you</em> had a withdrawal symptom, that is, felt sick because you stopped or cut down on drinking?</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
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<td>11.</td>
<td><em>In the last three months, how often have you</em> noticed a change in your personality?</td>
<td>☐</td>
<td>☐</td>
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<td>12.</td>
<td><em>In the last three months, how often have you</em> felt that you had a problem with alcohol?</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>13.</td>
<td><em>In the last three months, how often have you</em> missed a day (or part of a day) of school or work?</td>
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<td>☐</td>
<td>☐</td>
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<td>☐</td>
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<td>14.</td>
<td><em>In the last three months, how often have you</em> tried to cut down or quit drinking?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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<tr>
<td>15.</td>
<td><em>In the last three months, how often have you</em> suddenly found yourself in a place that you could not remember getting to?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>16.</td>
<td><em>In the last three months, how often have you</em> passed out or fainted suddenly?</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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<td>17.</td>
<td><em>In the last three months, how often have you</em> had a fight, argument, or bad feelings with a friend?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tbody>
</table>
18. *In the last three months, how often have you had a fight, argument, or bad feelings with a family member?* □ □ □ □ □

19. *In the last three months, how often have you kept drinking when you promised yourself not to?* □ □ □ □ □

20. *In the last three months, how often have you felt you were going crazy?* □ □ □ □ □

21. *In the last three months, how often have you had a bad time?* □ □ □ □ □

22. *In the last three months, how often have you felt physically or psychologically dependent on alcohol?* □ □ □ □ □

23. *In the last three months, how often have you was told by a friend or neighbor to stop or cut down on drinking?* □ □ □ □ □

**DDQ-Modified**

*For each day of the week, fill in both the number of drinks consumed and the number of hours you typically drink.*

*Please be sure to fill out the information regarding your gender, weight, and height.*

1. For the past month, please fill in a number for each day of the week indicating the *typical number of drinks* you usually consume on that day, and the *typical number of hours* you usually drink on that day.

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
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</thead>
<tbody>
<tr>
<td># drinks</td>
<td></td>
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<tr>
<td># hours</td>
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</tbody>
</table>
**PTSD**

Instructions: Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, put an “X” in the box to indicate how much you have been bothered by that problem in the last month.

<table>
<thead>
<tr>
<th>No.</th>
<th>Response</th>
<th>Not at all (1)</th>
<th>A little bit (2)</th>
<th>Moderately (3)</th>
<th>Quite a bit (4)</th>
<th>Extremely (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Repeated, disturbing memories, thoughts, or images of a stressful experience from the past?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2.</td>
<td>Repeated, disturbing dreams of a stressful experience from the past?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>3.</td>
<td>Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>4.</td>
<td>Feeling very upset when something reminded you of a stressful experience from the past?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>5.</td>
<td>Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful experience from the past?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>6.</td>
<td>Avoid thinking about or talking about a stressful experience from the past or avoid having feelings related to it?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>7.</td>
<td>Avoid activities or situations because they remind you of a stressful experience from the past?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>8.</td>
<td>Trouble remembering important parts of a stressful experience from the past?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>9.</td>
<td>Loss of interest in things that you used to enjoy?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>10.</td>
<td>Feeling distant or cut off from other people?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>11.</td>
<td>Feeling emotionally numb or being unable to have loving feelings for those close to you?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>12.</td>
<td>Feeling as if your future will somehow be cut short?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>13.</td>
<td>Trouble falling or staying asleep?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>14.</td>
<td>Feeling irritable or having angry outbursts?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<td>15.</td>
<td>Having difficulty concentrating?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>16.</td>
<td>Being “super alert” or watchful on guard?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>17.</td>
<td>Feeling jumpy or easily startled?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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</tbody>
</table>
**DMQ**

Here is a list of reasons people give for drinking alcoholic beverages. Using the response categories below, please indicate how often you drink for each of the following reasons. There are no right or wrong answers to these questions. We just want to know about the reasons why you usually drink when you do.

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<td>18.</td>
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<td>20.</td>
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Brief COPE

These items deal with ways you've been coping with the stress in your life. There are many ways to try to deal with problems. These items ask the degree to which you have been having each response during the past 3 months up to the present. Each item says something about a particular way of coping. I want to know to what extent you've been doing what the item says; how much or how frequently. Don't answer on the basis of whether it seems to be working or not—just whether or not you're doing it.

1 = I haven't been doing this at all
2 = I've been doing this a little bit
3 = I've been doing this a medium amount
4 = I've been doing this a lot

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CURRICULUM VITA

Anabel Cardiel was born in El Paso, Texas. She started her education in Ciudad Juarez, Chihuahua, Mexico until 4th grade of elementary school when her family decided to move to El Paso. In 2004, she graduated from Chapin High School and decided to promptly continue her education. Science has always been of great interest to her, especially the study of Molecular Biology. In 2009, she obtained her Bachelor’s of Science, with a major in Microbiology and a minor in Chemistry.

Various Microbiology courses helped Anabel understand the great amount of diseases that are prevalent in our community and how vulnerable we may be to these diseases. This knowledge encouraged Anabel to return to the University of Texas at El Paso and pursue a Master of Public Health. During the completion of her Master’s degree, Anabel discovered her passion for disease prevention and community health education and finally found a path that she can make a difference in. Throughout the completion of the Master’s, Anabel had the opportunity to work in various projects within the community. Specific projects, which she was most passionate about, include HIV/AIDS awareness, foodborne illness prevention and education, and working with minority groups on a wide variety of health issues. In 2012, Anabel graduated with a Master of Public Health and will strive to pursue a career in Public Health. During the completion of her Master’s, she met a wonderful group of people, including her colleagues and professors, who she has learned tremendously from and who have encouraged her to never give up on her dreams. She currently plans to move to the District of Columbia, Washington to acquire a job that will allow her to make an impact on the community.