

2017

## **Predictors of Alcohol Use Among Firefighters and Emergency Medical Technicians**

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PREDICTORS OF ALCOHOL USE AMONG  
FIREFIGHTERS AND EMERGENCY MEDICAL  
TECHNICIANS

BY

JOSHUA A. MUNIZ

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN

PSYCHOLOGY

UNIVERSITY OF RHODE ISLAND

2017

MASTER OF ARTS THESIS

OF

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2017

## **Abstract**

A motivational model of alcohol use, developed by Cooper and her colleagues in 1995, was replicated and extended by incorporating social antecedents and motives, which were originally introduced by Read and her colleagues in 2003. Additionally, conformity motives of alcohol use and its antecedents, which were originally introduced by Cooper (1994) and an exogenous variable of relationship satisfaction were introduced to expand and test a cross-sectional model in a sample of firefighters and Emergency Medical Technicians (FF/EMTs). Participants (N = 205) completed a questionnaire battery assessing alcohol use, alcohol expectancies, sensation seeking, stress factors, social influences, and drinking motives. These findings point to the importance of stress factors and coping motives when considering a population of professional FF/EMTs.

## ACKNOWLEDGEMENTS

This work would not have been possible without the support of my Major Professor, Dr. Lisa Harlow. I am especially indebted to Dr. Andrea Paiva (Co-Major Professor), Dr. Paul Florin (inside committee member), Dr. Skye Leedahl (outside committee member), and Dr. Ward-Ritacco (defense chair) who have been supportive of my academic goals and who worked actively to provide me with the protected academic time to pursue those goals. I am grateful to all of those with whom I have had the pleasure to work during this and other related projects. I would like to thank Dr. Mark Wood who began this journey with me four years ago before he passed away in the spring of 2015. His reinforcing encouragement and constant support will never be forgotten. Also, I would like to thank each of the members of my thesis committee who have provided me personal and professional guidance and taught me a great deal about both scientific research and life in general. I would especially like to thank Dr. Lisa Harlow again. As my teacher and mentor, she has taught me more than I could ever give her credit for here. She has shown me, by her example, what a good scientist and researcher should be.

This work would also not have been possible with the support of the command staff and union executives in which the research was conducted upon. This project would not have been possible without their approval and support.

Nobody has been more important to me in the pursuit of this project than the members of my family. I would like to thank my parents, whose love, guidance, and prayers are with me in whatever I pursue. Most importantly, I wish to thank my loving

and supportive wife, Melissa, and my three wonderful children, Tyler, Noah, and Caden, who provide unending inspiration for me to be a better husband, father, student, firefighter, and individual. Their mere existence has made me a better man.

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## **Statement of the Problem**

Alcohol use and misuse, defined here as heavy drinking, associated consequences, and alcohol use disorders, constitute a substantial public health issue, with an estimated societal cost of approximately \$224 billion per year (Bouchery, et al., 2011). Alcohol use and misuse peaks, for most, during emerging adulthood. For example, large scale epidemiological studies indicate that the highest levels of excessive consumption and alcohol related problems and dependence symptoms occur in the early 20s (Verges A., et al., 2012). Due to these epidemiological patterns and the convenience of a readily available population to study, much alcohol consumption research has focused on college students (Hingson, et al., 2009). Alcohol use and misuse also varies by occupations. In 2004, the prevalence rate of heavy alcohol use (five or more drinks on five or more occasions during the past 30 days), among full- and part-time employees aged 18 to 49 was 10.3% and 9.4%, respectively (U.S. Department of Health and Human Services, 2004). Although seemingly low, these averages conceal the fact that employee problem drinking varies considerably by occupation and gender (Berger, et al., 2009). Certain occupations appear to be more susceptible to problematic alcohol use than others. For example, a study conducted among urban professional firefighters showed a strong correlation between occupational stress and posttraumatic stress disorder (PTSD) diagnosis, depressive symptoms, and alcohol use disorders (Murphy, et al., 1999). Bacharach, Bamberger, and Doveh (2008) supported findings of problematic alcohol use in a second study among professional firefighters. Therefore, occupational stress among certain professions may be of particularly importance when examining the mental health



outcomes among firefighters. However, it is unclear as to what leads to higher consumption rates within different occupations. Does negative work experience, such as stress, lead to employee problem drinking, or do employees who drink problematically experience more difficulties at work, such as increased levels of job stress, due to their drinking? What types of characteristics or situations are apt to lead to more drinking? It is important that specialized populations that experience stress on the job, such as firefighters, are further evaluated to understand the nature of problematic alcohol rates, and to study what may be relevant risks or other predictive factors.

**Predictors of Problem Drinking.** Research has examined drinking behaviors in specific populations, such as police officers, in order to understand the role of stress in drinking patterns. Ménard and Arter (2013) found that police officers' negative and avoidant coping was related to greater problematic alcohol use; PTSD symptomology and coping had both significant direct and indirect associations (through critical incidents) with these outcomes. Although investigation into specific occupations such as firefighting is limited, research has found that heavy drinking is prevalent among firefighters and a significant percentage of fire service personnel are at risk for alcohol-related problems (Haddock, et al., 2012).

A number of studies has identified social and psychological correlates of alcohol use and misuse (e.g., Baer & Carney, 1993; Fromme & Ruela, 1994; Read, Kahler, Wood, Maddock, & Palfai, 2003). Additionally, research has focused on the specific role of motivational models and their relation to alcohol use and problems (e.g., Carey &

Correia, 1997; MacLean & Lecci, 2000; Read, et al., 2003). In contrast to the significant amounts of research on alcohol consumption and consequences that has been conducted on college students (Correia, Murphy, & Barnette, 2012), research is still evolving on alcohol use and misuse within high risk jobs in the public safety sectors, such as firefighters and emergency medical technicians (i.e., Emergency Medical Service (EMS) providers: Bacharach, et. al., 2008; Haddock, et al., 2012). Furthermore, despite an increased awareness of the possible consequences associated with the stressors placed on the well-being of EMS providers, there is an insufficient amount of published behavioral health research on EMS personnel and very little is known about the drinking patterns of this trauma-exposed population. In addition to life-threatening situations, such as response to fire and chemical or hazardous materials incidents, EMS providers, such as firefighters, deal with a wide variety of work-related stressors, including emergency medical care to adults and children, response to large-scale disasters, body recovery, and dangerous work settings. There are also smaller but potentially hidden stressors, including economic threats, equipment failures, and co-worker conflicts within this profession. Often, little to no warning precedes the onset of any type of stressor due to the unknowns in which emergency staff are confronted with at any given moment.

Due to the nature of the occupation, much of the focus of alcohol research, although still in the development stage, has been on the occupational stress for this population and their consumption of alcohol in order to cope (e.g. Bacharach, et al., 2008; Corneil, Beaton, Murphy, Johnson, & Pike, 1999; Prati, Pietrantonio, & Cicognani, 2011). Following the aftermath of September 11, 2001 (i.e., 9/11), research began to

focus on the exposure of disaster workers in order to understand, examine, and better plan for the health care of these individuals. In the general population, the rates of PTSD and depression are estimated to range from 1.9% to 10%, (Carey, Al-Zaiti, Dean, Sessanna, & Finnell, 2011). Firefighters and rescue/disaster workers, however, have shown much higher levels of PTSD symptoms with rates that range from 11% to 32% (Fullerton, Ursano, & Wang, 2004). Several studies have examined the collective impact of multiple stressors on EMS providers' drinking behaviors (Bacharach, et al., 2008; Carey, et al., 2011; Haddock, et al., 2012; Kimbrel, Steffen, Meyer, Kruse, Knight, Ziering, & Gulliver, 2011), yet almost no published data have assessed other possible mediating variables, other than stressors encountered by this population, that may play a role in this misuse and abuse of alcohol. Most of the attention has been directed at the stressors that have been previously mentioned, most notably duty-related incident stressors, such as fatalities, injuries, or gruesome victim incidents (Beaton, Murphy, Johnson, Pike, & Corneil, 1999; Fullerton, et al., 2004).

Given the substantial occupational stressors detailed above, it is reasonable that stress and coping have been the predominant focus of prior research. However, it has been recognized in the more general etiologic literature (Cooper, Frone, Russell, & Mudar, 1995; Cox & Klinger, 1988; Read et al., 2003) that alcohol use and misuse are associated with a range of psychosocial factors. Furthermore, little attention has been given to the prevalence and pattern of alcohol consumption in the social network of firefighters (Carey, M. et al., 2011).

As such, the goal of the current study is to conduct a broader study of the psychosocial correlates of alcohol use and misuse among individuals employed through the fire service, which include both firefighters and emergency medical technicians (FF/EMTs). In addition to negative reinforcement motives for drinking (i.e. drinking to cope due to stress), alcohol is often associated with positive reinforcement (Cox & Klinger, 1988). Accordingly, building on research from other populations (e.g., Cooper, et al., 1995; Read et al., 2003), there is a clear need to more broadly examine motives for drinking and related correlates among FF/EMTs. If research can pinpoint more underlying factors that influence drinking behaviors, particularly problematic ones, then this understanding can lead to more complete elucidation of the patterns and correlates within this dynamic population. Further, enhanced awareness could then inform the development and refinement of preventive interventions for this population.

### **Justification for and Significance of the Study**

To broaden the focus of prior research, the current study did not only examine stress as a possible factor contributing to alcohol consumption, but also considered alcohol use in the context of both positive and negative reinforcement. Drinking motives have been identified as an important component in understanding why individuals choose to use alcohol (Martens, Rocha, Martin, & Serrao, 2008). Cooper, Frone, Russell and Mudar (1995), developed a motivational model of alcohol use in which people are hypothesized to consume alcohol to regulate both positive and negative emotion. In theory, individuals drink alcohol to control or impact the quality of their emotional

mental condition. Specifically, individuals may use alcohol to either reduce negative affect when they are anxious or over-aroused, or to enhance positive affect when they are fatigued, under-aroused, or desire to enhance social occasions or interpersonal cohesion (Wills & Shiffman, 1985). In addition, Read, Wood, Kahler, Maddock, and Palfai (2003) expand this model to include social factors for alcohol consumption. In their research, they found that social reinforcement motives, combined with both enhancement and coping motives, played a role in the connection between social influence factors and alcohol use.

One of the most routinely used measures to examine drinking motives is the Drinking Motives Measure (DMM: Cooper, 1994; Cooper, Russell, Skinner, & Windle, 1992). The DMM was originally developed as a three-subscale measure that assessed Social, Enhancement, and Coping motives for alcohol use. In a follow-up study, Cooper (1994) developed items to assess a second negatively reinforcing motive, Conformity, because she believed that a desire to fit in with one's peers would be a strong motivating factor to use alcohol among adolescents.

Although Cooper (1994) used an adolescent population with the inclusion of conformity motives, we believe that the four-factor model will be applicable to this study's population of interest as well. As detailed subsequently, EMS personnel, more specifically firefighters, exhibited behaviors that support the inclusion of conformity motives.

Furthermore, in addition to drinking motives, numerous studies have demonstrated a consistent relationship between marital status and alcohol use, supporting the notion that marriage may provide protection from a variety of physical and psychological problems (Millar-Tutzauer, Leonard, & Windle, 1991). Married men and women consume considerably less alcohol on the average than single, separated or divorced persons (Clark & Midanik, 1982). Epidemiological studies have demonstrated a lower risk for alcoholism and alcohol problems among married individuals relative to those who never married and those separated or divorced (Clark & Midanik, 1982). This position does not suggest that marriage is not accompanied by numerous other stresses and challenges. Therefore, a measure of one's relationship satisfaction, in place of marital status, will be used to accentuate the complexity of drinking behaviors within the population of interest.

### Relationship Status

In reviewing the literature of previous studies conducted on alcohol consumption, stress, and both areas of interest together, FF/EMTs and most public safety sectors are less represented in the samples. In the few studies that have been reviewed about FF/EMTs, their alcohol consumption rates are often associated with stress and drinking to cope (e.g. Bacharach, et al., 2008). Not only is it important to consider whether and how motivational factors predict alcohol consumption within this population of FF/EMTs but how other constructs could contribute to the understanding of the phenomenon. Therefore, along with the principles of positive affect (i.e. enhancement motives),

negative affect (i.e. coping and conformity motives), and social reinforcement motives, this study will further expand the understanding of alcohol consumption within this population of FF/EMTs to examine the potential association between relationship satisfaction and alcohol use. A brief history on the literature addressing the construct of relationship satisfaction will be reviewed next.

Prior research has examined the influence of acute factors, such as traumatic stress and problematic alcohol use, on relationships (Meis, Erbes, Polusny, & Compton, 2010). Using a sample of 308 Army National Guard soldiers returning from Iraq, Lund and Thomas (2014) found that higher exposure to prior life stressors, post-traumatic stress, and alcohol misuse were all significantly correlated with lower relationship satisfaction.

Taking into consideration that a soldier's exposure to stress and a FF/EMT's exposure can be quite different, it is noteworthy to mention that relationship satisfaction has been demonstrated to play a significant role in the response to psychological distress within the military population. Involvement in a significant emotional relationship may influence the degree to which one receives effective emotional support, which may lessen symptoms of stress (Shaffer, T.J., 2010).

Therefore, it is hypothesized that relationship satisfaction will ultimately play a role in the degree to which an individual drinks. If an individual is established in a satisfied relationship, he/she may be more likely to receive effective emotional support,

whereas, if an individual is single, he/she may be more likely to seek other avenues to lessen the symptoms of stress and may turn to alcohol use.

### Enhancement Motives

Enhancement motives involve the strategic use of alcohol to increase positive affective states or emotional experience. Drinking to enhance is therefore conceptualized as an appetitive process—as behavior emitted to achieve a desired state or outcome rather than avoid or minimize an aversive one (Cooper, et al., 1995). Salient predictors of enhancement motives to consider include social lubrication outcome expectancies and impulsivity-sensation seeking. Social lubrication expectancies are beliefs that alcohol use will enhance social situation and make them more enjoyable (Read, et al. 2003).

Impulsivity, which is defined as a general tendency to act without planning ahead and to seek out immediate gratification, has been thought to be related to all types of drinking motivations (Mackinnon, Kehayes, Clark, Sherry, & Stewart, 2014). Sensation seeking represents the need for intense, novel, and exciting experiences (Zuckerman, 1994). Both constructs, impulsivity and sensation seeking, have often been conceptually linked and associated with increased alcohol use (e.g. Mackinnon, et al., 2014). Studies have linked enhancement motives to drinking behavior in college students (Carey & Correia, 1997; Stewart, Zeitlin, & Samoluk, 1996), although it does not appear that such linkage has been made with FF/EMTs.

### Coping motives



Coping motives for alcohol consumption, or more commonly referred to as drinking to cope (DTC) motivation, are presumed to operate on the principle of negative reinforcement and involve drinking to make one's negative feeling more tolerable (Cooper, et al., 1992; Read, et al., 2003). Notable predictors of DTC motivation are negative affect and tension-reduction alcohol expectancies. Research has linked both negative affect (i.e., Cooper, 1994; Cooper, et al., 1995, Read, et. al., 2003) and tension-reduction alcohol expectancies (i.e., Conger, 1956; Kushner, Sher, Wood, & Wood, 1994) to alcohol use and misuse and can be considered important predictors of DTC motivations. Also, research conducted on specific populations, such as FF/EMTs, has linked stress with DTC motivations for alcohol use (Corneil, et al., 1999; Murphy, et al., 1999). Consequently, for this current study, it is hypothesized that DTC motivations will mediate tension-reduction alcohol expectancies and occupational stress with an individual's alcohol use. A brief description of each predictor is explained next.

Tension-reduction theory (Conger, 1956) has been put forward as a model explaining alcohol use, which suggests that (1) alcohol reduces tension states such as anxiety and (2) alcohol is sought and consumed for its tension-reducing properties (Kushner, et al., 1997). Furthermore, tension-reduction alcohol expectancies have been demonstrated to be associated with problem drinking and individuals who possess these expectancies will be motivated to drink at times when they experience negative mood states (Kushner, et. al., 1994; Read, et al., 2003). Research has demonstrated that those who possess these expectancies will be motivated to drink at times when they experience

such emotions and it is hypothesized that these expectancies will be attributable to FF/EMTs.

Occupational stress is known to contribute to a range of psychological, behavioral, and physical health problems (Corneil et al., 1999; Murphy et al., 1999); it is perhaps not surprising, then, that firefighters have been shown to be at increased risk for substance use disorders, depression, posttraumatic stress disorder (PTSD), and occupational burnout (e.g., Beaton & Murphy, 1993; Corneil et al., 1999). As mentioned earlier, firefighters face a significant amount of occupational stress. These men and women provide many essential public services, including responding to fires, medical emergencies, traffic accidents, and natural disasters. Due to the unique nature of their work, firefighters often report elevated levels of occupational stress (Beaton & Murphy, 1993; Corneil, et al., 1999; Murphy, et al., 1999). For example, firefighters must cope with exposure to potentially traumatic events (e.g., recovering dead bodies) on a regular basis (Beaton, Cornell, Pike, & Murphy, 1996; Corneil, et al., 1999; Murphy, et al., 1999), and they are required to perform many physically and psychologically demanding tasks in dangerous and high-pressure situations such as suppressing fires, entering burning buildings to rescue trapped victims, and providing medical aid to seriously injured victims (Kimbrel, et al., 2011). Research has offered a number of physiological explanations for the linkages between incident exposure, subsequent negative affect, and problematic drinking behaviors as an attempt to cope with stress and trauma (Bacharach, et al., 2008). For example, studies have proposed that the link between incident exposure and drinking may be endorphin related (Volpicelli, Balaraman, Hahn, Wallace, & Bux,

1999). The findings from such studies suggest that individuals who experience a traumatic event often experience a biochemical response of an endorphin release, which helps to numb the physical and emotional pain of the trauma (Bacharach, et al., 2008). However, in order to replace the endorphin-based numbing effect after it has subsided, some individuals may turn to alcohol to cope with the ongoing stress and trauma. Seeing that epidemiological evidence suggests that the job-related stressors of fire service personnel causes a heavy toll in terms of elevated occupational prevalence of PTSD as well as many other adverse health outcomes (Beaton, et al., 1996), there is widespread agreement that certain coping responses are generally adaptive or protective, while others, such as an over-reliance on alcohol, are maladaptive (Beaton, et al., 1999). As such, this current study used occupational stress and tension-reduction alcohol expectancies, as predictors of DTC motivations for alcohol use.

### Social Reinforcement Motives

Social reinforcement motives involve drinking alcohol for social purposes, such as to enhance the enjoyment of a social occasion, to facilitate social interaction, or to partake in a shared social activity (Cooper, 1994). A notable predictor of social reinforcement motives to drink is alcohol offers (AO). AO, as defined here, is simply a measure of direct and explicit offers to use alcohol such as being offered a drink (Read, et al., 2003).

Although no study, to my knowledge, has examined social reinforcement motives among FF/EMTs, these motives are believed to play a central role in alcohol consumption

amongst this population. In the world of the fire service, firefighting is an occupation with characteristics such as close quarter living and/or camaraderie. For instance, firefighters spend many hours in their assigned stations and during these hours they perform activities together such as cooking for an evening meal, or exercising with each other. Spending many hours together creates a social bond between many of the members. Many firefighters continue this social bonding after their shift has ended and given the fact that the concept of brotherhood is deeply rooted in the common experience of individuals within the fire service, research examining social reinforcement motives and other social influence correlates in this population constitutes an important focus. It is possible that due to this social bond, one's drinking behavior may be affected by their social or peer influences.

### Conformity Motives

Conformity motives, which are defined as external/negative drinking motives, were originally described as drinking in response to social pressures (Cooper, 1994). Conformity motives have had inconsistent results with weak predictive power of alcohol use. However, drinking to conform is primarily responsive to external social pressures to drink (Cooper, 1994) and it appears to be applicable to a fire service population. Furthermore, studies have mostly used social anxiety measures to predict conformity motives to alcohol use within college student populations (i.e., Lewis, et al., 2008). Due to the difference in our population of interest, social anxiety measures are believed to not play a role in conformity motives for alcohol use. Therefore, a new predictive measure of

sense of community will be used in an attempt to more accurately explain conformity motives to drink in a FF/EMT population. A brief description of sense of community, used as a predictor of conformity motives, will be explained next.

Sense of community, often referred to as psychological sense of community, has been predominantly associated with the McMillan and Chavis (1986) model. Alternative conceptions and measures notwithstanding, the Sense of Community Index (SCI) or some adaptation of it, has been utilized by much of the empirical work that has measured SOC (Peterson, et al., 2008). The SCI was intended to be a brief assessment of the four dimensions of SOC as articulated in McMillan and Chavis' (1986) model. These dimensions include needs fulfillment (a perception that members' needs will be met by the community), group membership (a feeling of belonging or a sense of interpersonal relatedness), influence (a sense that one matters, or can make a difference, in a community and that the community matters to its members), and emotional connection (a feeling of attachment or bonding rooted in members' shared history, place or experience; Peterson, et al., 2008).

Based on previous research and the conceptual associations described above, the present study has three main objectives: (1) to examine whether Cooper et al.'s (1995) motivational model of alcohol use would generalize to a population of firefighters and EMTs who deal with substantial occupational stressors, (2) to extend this model to include both social factors (social influence antecedents and social reinforcement motives) and conformity motives (sense of community), and (3) to test this model with the inclusion of relationship satisfaction in order to explain drinking behavior.

## **Methodology**

### *Participants*

Participants were firefighters/EMTs (FF/EMTs) selected from a career fire department located in the northeastern United States. As a part of a cross-cultural study of alcohol use, 225 FF/EMTs, were recruited in the spring of 2016. As a result of a significant amount of missing data from 20 individuals, the sample size was adjusted to 205, 196 males (96%) and 9 females (4%). Participants were an average of 43.6 (SD = 9.34) years old. The majority of participants, approximately 85.64%, were White, while approximately 5% identified as Hispanic/Latino and approximately 5% as Black/African American. Six participants (2.9%) identified as American Indian or Alaskan Native. Two participants (0.97%) identified as Asian/Pacific Islander. Four individuals (0.49%) preferred not to answer their ethnic background question. The average amount of years, for participants, working as a career FF/EMT on that particular fire department was 16.9 (SD = 9.5). Lastly, 173 (84%) participants reported being in a relationship, and 32 (16%) reported to be single.

### *Procedure*

Participants were contacted initially by the fire department's email server during the spring of 2016 and were invited to complete a confidential survey of FF/EMT health behaviors. All participants provided informed consent and then completed a battery of questionnaires (See Appendix A). The survey remained open to be completed by members for a period of two months. The recruitment procedure was concluded upon

receiving surveys from 225 participants. As mentioned, as a result of significant missing data from 20 participants, the sample size was adjusted to 205.

### *Measures*

#### **Impulsivity/Sensation Seeking, Social Lubrication, Tension-Reduction, Occupational Stress, Alcohol Offers, Sense of Brotherhood, Relationship Satisfaction (Exogenous Manifest Variables)**

##### ***Impulsivity/Sensation Seeking***

Impulsivity-sensation seeking is a 19-item personality trait measure assessed with a true-false format by the Impulsivity/Sensation Seeking Scale (Zuckerman, 1994). Items include “I usually think about what I am going to do before doing it” and “I like to have new and exciting experiences and sensations even if they are a little frightening.”

Coefficient alpha was 0.81 in a college sample from previous research (Read, et al., 2003). In this study, however, when calculated as a complete scale for this sample, coefficient alpha was 0.654, indicating less, yet acceptable internal consistency.

Furthermore, if considering both constructs, impulsivity and sensation seeking separately as subscales, internal consistency drastically declines for both impulsivity ( $\alpha=0.346$ ) and sensation seeking ( $\alpha=0.524$ ). Therefore, the full scale was utilized for this present study.

##### ***Social Lubrication***

Social Lubrication is an 8-item scale devised by Sher, Walitzer, Wood, and Brent (1991). Items include “Drinking makes any celebration more enjoyable” and “Drinking

makes me feel cool.” Response options range from 0 (not at all) to 4 (a lot). Coefficient alpha for this variable in this sample was ( $\alpha=0.887$ ).

### ***Tension-Reduction***

Tension-reduction alcohol expectancies is a 9-item scale devised by Sher, Walitzer, Wood, and Brent (1991). Items include “Drinking helps me forget problems at work” and “Drinking helps me to feel better when I am down.” Response options range from 0 (not at all) to 4 (a lot). Coefficient alpha for this scale was  $\alpha=0.912$ .

### ***Occupational Stress***

Stress was measured using the Sources of Occupational Stress – 14 (SOOS-14), assessing occupational stressors specific to firefighters and emergency response personnel (Beaton & Murphy, 1993). The revised SOOS-14 is a practical, reliable, and valid measure of occupational stress and the brevity of the SOOS-14 renders it more manageable than the full 57-item version. Items include “How bothered are you about having a poor diet while eating at the station?” and “How bothered are you about exposure to anxious or overly demanding coworkers or administrators?” Response options range from 0 (not at all bothered) to 4 (extremely bothered). The internal consistency coefficients for two separate studies were sufficient for the shortened SOOS-14 version as well ( $\alpha=.82$ ;  $\alpha=.86$ ; Kimbrel, et al., 2011). Coefficient alpha for this study was  $\alpha=0.859$ .

### ***Alcohol Offers***



Alcohol offers are assessed with 4 items that assess the frequency the participant has been given or offered a drink without requesting one or has been given unwanted refills. Items include “How many times have you been given a drink without asking for it?” and “How many times has someone filled up your drink without asking you if you wanted it filled up?” Response options range from 1 (1-2 times) to 4 (10 or more times). Coefficient alpha for this measure has shown to be 0.88 in a college sample (Read, et al., 2003). Alcohol offers represent a more direct form of social pressure that may uniquely motivate drinking behaviors (Wood et al., 2001). Coefficient alpha for this measure in the current study was  $\alpha=0.884$ , which was virtually identical to that from Read et al. (2003).

### ***Sense of Brotherhood***

One’s sense of community was assessed using an 8-item scale referred to as the Brief Sense of Community Scale (BSCS). This scale is a shorten version of the original Sense of Community Scale which is designed to assess the dimensions of needs fulfillment, group membership, influence, and emotional connection as defined in the McMillan and Chavis (1986) model. Furthermore, for this particular study, the wording for each item was slightly changed to address the population of interest. For example, an original item says, “I feel connected to this neighborhood.” The wording for this study says, “I feel connected to this brotherhood.” Traditionally, brotherhood signifies what one is willing to do for their brother (i.e., FF/EMT colleague). It is a solemn oath to face danger and fear and even give one's life, if necessary, for their brother. It is not a matter of receiving but a matter of giving. It is not a matter of avoiding personal accountability, rather a matter of accepting responsibility. This adjustment in wording is assumed to be

more applicable to firefighters. In addition, all BSCS items were designed to reference respondents' sense of brotherhood and used a 5-point, Likert-type response option format ranging from strongly agree to strongly disagree. Cronbach's alpha for the overall BSCS in previous research showed good internal consistency of 0.92, with alphas for the subscales as 0.86 for needs fulfillment, 0.94 for group membership, 0.77 for influence, and 0.87 for emotional connection (Peterson, et al., 2008). However, the current research wanted to avoid the use of only two items per subscale and thus, for this study, the overall BSCS scale was used with Cronbach's alpha being 0.919 which was almost identical to the overall internal consistency found in prior research.

### ***Relationship Satisfaction***

The DAS-4 is a 4-item abbreviated form of the Dyadic Adjustment Scale (DAS), which is a 32-item scale used to measure dyadic adjustment containing four subscales which measure dyadic satisfaction, dyadic consensus, dyadic cohesion, and affectional expression. Compared with the 32-item version, the DAS-4 proved to be informative at all levels of couple satisfaction and was effective in predicting couple dissolution with less contamination due to socially desirable responding (Sabourin, Valois, & Lussier, 2005). The traditional standardized alpha for the DAS-4 was 0.84 (Sabourin, et al., 2005). Items for the couple satisfaction scale include, "How often do you discuss or have you considered divorce, separation, or terminating your relationship?", "In general, how often do you think that things between you and your partner are going well?", "Do you confide in your mate?", and "Please circle the option which best describes the degree of

happiness, all things considered, of your relationship.” In this study, coefficient alpha for this variable was acceptable in terms of internal consistency ( $\alpha=0.653$ ).

### **Enhancement, Coping, Social Reinforcement, and Conformity Drinking Motives (Mediating Manifest Variables)**

The Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) is a 20-item self-report questionnaire designed to assess the four drinking motives in Cooper's model: social (e.g., “To be sociable.”), enhancement (e.g., “Because it's exciting.”), coping (e.g., “To forget your worries.”), and conformity (e.g., “Because your friends pressure you to drink.”). Participants are asked to estimate frequency of drinking for each listed reason, considering all occasions the individual has consumed alcohol, on a scale ranging from 1 (almost never/never) to 5 (almost always/always). Internal consistency reliability for drinking motives were good for all four subscales {enhancement ( $\alpha=0.848$ ), coping ( $\alpha=0.847$ ), social reinforcement ( $\alpha=0.86$ ), and conformity ( $\alpha=0.793$ )}.

### **Alcohol Use (Latent Endogenous Outcome Variable)**

The Daily Drinking Questionnaire-revised (DDQ-r), used as the dependent measure, consists of a shortened version of the DDQ designed to measure quantity and frequency of alcohol consumption (Collins, Parks, & Marlatt, 1985). The DDQ-r asks participants to estimate average alcohol consumption for each day of the week during the previous 30 days (Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990). The DDQ-r also evaluates the participant's number of drinks and hours of drinking for each day of the week on both a typical drinking week and a heavy drinking week. The DDQ-r was

developed using college students, and the DDQ-r has been repeatedly used in this population.

Typically, this variable has been used as a single manifest variable, however, theoretically and visually, the DDQ-r divides alcohol use into four categories/variables (typical drinks per week, typical hours per week, heavy drinks per week, and heavy hours per week). It is unknown as to whether the DDQ-r has been used as a latent variable with four indicators of alcohol use. Furthermore, it is unknown as to whether the DDQ-r has been used amongst FF/EMTs. Therefore, the present study experimented with the use of this variable as a latent dependent variable which can provide input on the effectiveness of its use. Also, this study can yield advanced input on how generalizable this scale can be used beyond a college population such as a population of FF/EMTs.

Once more, a new dependent latent variable with four indicators to measure the outcome variable of alcohol use was utilized. Both internal consistency for the whole scale ( $\alpha=0.959$ ) and internal consistency for all four indicators, typical drinking ( $\alpha=0.856$ ), typical hours ( $\alpha=0.841$ ), heavy drinking ( $\alpha=0.873$ ), and heavy hours ( $\alpha=0.878$ ) were good. Standardized loadings for these four indicators ranged from 0.906 to 0.965 in Model 1 and were slightly improved standardized loadings, ranging from 0.907 to 0.968 in Model 2 (See figures 1 & 2).

## **Results**

### *Descriptive Statistics for Drinking Behaviors*

Based on the data collected in the spring of 2016, participants reported consuming approximately 10.9 drinks (SD = 10.579) on a typical week and approximately 15.24 drinks (SD = 13.88) on a heavy week, over the past 30 days. Participants also reported engaging in their heaviest drinking (3-4 drinks in one sitting) approximately once per week over the past 30 days (M= 3.078, SD = 1.702). For a full review of the summary statistics refer to Appendix B.

### *Overview of Data Analyses*

*Path analysis.* A set of nested structural models examined cross-sectional and structural relations among model variables. These included seven manifest, exogenous variables (impulsivity/sensation seeking, social lubrication, tension reduction, occupational stress, alcohol offers, sense of brotherhood, and relationship satisfaction), four manifest, intervening variables (enhancement, coping, social reinforcement, and conformity motives) and one endogenous latent variable (alcohol use), with four indicators described previously. The model, tested in each set, examined associations hypothesized by Cooper et al. (1995) of positive and negative emotion, social influences and social reinforcement hypothesized by Read et al. (2003), and reintroduced conformity influences that had been hypothesized by Cooper (1994). Furthermore, the model additionally added the manifest exogenous variable of relationship satisfaction in an attempt to examine the relationship between one's satisfaction in their relationship, to one's alcohol use.

The second model in the set of nested structural models is a revised model, with additional, non-hypothesized paths based on information retrieved from Lagrange multiplier tests (Bentler, 1989).

*Model specification.* Models were analyzed using a maximum-likelihood estimation procedure with seven manifest exogenous variables, four manifest mediators, and one latent outcome variable with four indicators. Covariances were estimated among the seven exogenous variables, and among the residuals of the four mediator variables.

*Evaluation of model fit.* Model fit was examined for the nested structural models using an omnibus chi-square test that was expected to be small relative to the degrees of freedom, the comparative fit index (CFI) that was expected to be at .90 or better, and root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) that were both expected to be less than .10.

*Examination of distributions.* Examination of the univariate distributions of model variables revealed significant skewness and kurtosis—greater than 2.0 and 4.0, respectively in one of the variables (conformity motives). To correct for non-normality, a log-10 transformation was performed to adjust the variable ‘conformity motives.’ Subsequent analyses indicated that skewness and kurtosis were within acceptable limits for the transformed variable.

*Cross-Sectional Path-Analytic Model*

A cross-sectional model assessed whether Cooper et al.'s (1995) and Read et al.'s (2003) motivational models would replicate in a FF/EMT sample and whether the inclusion of conformity motives and its predictor along with an additional exogenous variable, relationship satisfaction, would contribute to the fit of the model(s) to the data. Two cross-sectional model versions were tested: one positing full mediation by drinking motives and the second model allowing for estimation of 5 direct paths suggested by the Lagrange multiplier modification indices to be likely to improve overall model fit.

*Model 1: Hypothesized Motivational Model (See Figure 1)*

In this model, each of the exogenous variables were hypothesized to demonstrate positive associations with relevant drinking motive mediators and each mediating drinking motive variable was expected to relate with alcohol use. Accordingly, in this model, estimated paths were hypothesized based on Cooper et al. (1995) and Read et al. (2003), and additional paths from a sense of brotherhood factor to alcohol use through conformity motives was added. Furthermore, the relationship between relationship satisfaction and alcohol use was assessed.

The overall fit of the model was poor [ $\chi^2(63) = 419.406, p < .0001$ ]. The values of the CFI = 0.814, RMSEA = 0.167 90% CI [0.151, 0.181], and SRMR = 0.148 all do not meet the desired standards. Standardized loadings of all four indicators (typical drinking and frequency and heavy drinking and frequency) of the endogenous latent variable were good, 0.907, 0.906, 0.965, and 0.949 respectively. This model explained 11% of the variance in alcohol use, which is a small to medium effect size.

As can be seen in Figure 3, not all exogenous variables demonstrated a significant, positive association with respective drinking motives.

For the exogenous variables predicting the enhancement motives mediator, impulsivity/sensation seeking was not significantly associated although social lubrication was. Enhancement motives significantly mediated the relationship between social lubrication and alcohol use.

For the exogenous variables predicting the coping motives mediator, occupational stress was not significantly associated with coping motives, however tension reduction was. Also, coping motives significantly mediated the relationship between tension reduction and alcohol use.

For the exogenous variable predicting the social reinforcement motives mediator, alcohol offers was significantly associated with its mediator, yet social reinforcement did not significantly mediate the relationship between alcohol offers and alcohol use.

For the exogenous variable predicting the conformity motives mediator, the sense of brotherhood variable was not significantly associated with its mediator and conformity did not significantly mediate the relationship between brotherhood and alcohol use.

Additionally, the exogenous variable relationship satisfaction was not significantly associated with alcohol use.

Notably, out of the four hypothesized drinking motives, enhancement ( $\beta = 0.368$ ) and coping motives ( $\beta = 0.372$ ), in fact demonstrated significant mediation between at



least one of its exogenous variables and the latent endogenous outcome variable, alcohol use.

Finally, although the initial hypothesized model did not reveal fully mediated relationships through all four drinking motives and although the exogenous variable of relationship satisfaction did not appear to add any value to the model, there were significant relationships to be noted which are discussed in the next section.

*Model 2: Revised Model with inclusion of parameters from the 5 largest Lagrange multipliers (See Figure 2)*

The initial hypothesized full motivational model assumed that relations between exogenous and endogenous variables were fully mediated by the four drinking motives variables. Given the poor fit indices observed in Model 1, Model 2 added freely estimating paths for relationships indicated by the 5 largest Lagrange multipliers indices. Thus, additional paths were estimated from our exogenous variable alcohol offers to the latent dependent variable alcohol use. Additionally, paths were estimated from social lubrication to social reinforcement and conformity motives, and from tension reduction to enhancement and social reinforcement motives.

The overall fit of the revised Model 2 was good and substantially improved from that of Model 1 as assessed by chi-square difference tests and comparative fit indices, [ $\chi^2(58) = 230.164, p < .0001, CFI = 0.910, RMSEA = 0.121$  90% CI [0.104,0.137], and SRMR = 0.037. Standardized loadings of the four indicators (typical drinking and

frequency and heavy drinking and frequency) of the endogenous latent variable were 0.909, 0.907, 0.968, and 0.951 respectively. This model explained approximately 38% of the variance in alcohol use, representing a large effect size.

As can be seen in Figure 4, not all exogenous variables demonstrated a significant, positive association with their respective drinking motive mediators. For the exogenous variables predicting enhancement motives, impulsivity/sensation seeking remained insignificantly associated with enhancement motives, while social lubrication and tension reduction were significantly associated with enhancement motives. Further, enhancement motives continued to mediate the relationship between its revised exogenous variables (social lubrication and tension reduction) and the latent endogenous outcome variable, alcohol use.

For the exogenous variables predicting coping motives, occupational stress continued to have an insignificant association with coping motives, however tension reduction remained significantly associated with coping motives, which continued to mediate the relationship with the endogenous variable, alcohol use.

For the revised exogenous variables predicting social reinforcement motives, alcohol offers, social lubrication, and tension reduction all demonstrated to be significantly associated with its mediator. However, similar to Model 1, there was not a significant mediational link to the outcome, alcohol use.

For the exogenous variable predicting conformity motives, the sense of brotherhood variable was not significantly associated to conformity motives. However,

the additional estimated path from social lubrication to conformity motives showed a significant relationship. Additionally, differing from Model 1, a mediated relationship between social lubrication and alcohol use was demonstrated through conformity motives.

Model 2 demonstrated more of a mediational link between its exogenous and endogenous variables. Enhancement motives ( $\beta = 0.297$ ), coping motives ( $\beta = 0.433$ ), and conformity motives ( $\beta = -1.504$ ) demonstrated significant mediation between at least one of their respective exogenous variables and the latent endogenous outcome variable, alcohol use. However, the converged solution of Model 2 may be inadmissible. The standardized parameter estimate linking conformity motives to alcohol use ( $\beta = -1.504$ ), exhibits an illogical value that falls outside of the normal bounds of -1 to +1. This large negative path coefficient estimate that is greater than an absolute value of 1 reveals what is called a Heywood case. Some causes of this problem could be the presence of outliers that can distort the solution, non-normality that is known to be present with substance use data, collinearity such that two or more variables are highly redundant, a small sample size, or including one or more parameters that are not plausible in a model such that an out-of-bounds parameter estimate emerged when trying to find model estimates. Further inquiry into the problem needs to be addressed to verify the adequacy of the proposed Model 2 and to see if the Heywood case can be rectified.

Finally, an added estimated path from alcohol offers revealed a significant association with the latent endogenous outcome variable, alcohol use.

## Discussion

The present study extended previous literature with respect to drinking motives. These motives were used as the basis for examining their mediational role with presumed psychosocial predictors of drinking and alcohol use beyond a college sample. Further, this study attempted to test whether Cooper et al.'s (1995) and Read et al.'s (2003) models would explain drinking behaviors amongst a sample of FF/EMTs, which has not previously been fully investigated using this model. Specifically, it was investigated whether this model would be improved by 1.) the incorporation of a mediator of conformity motives, and 2.) relationship satisfaction as a predictor of alcohol use.

Cooper et al. (1995) examined how positive and negative emotions (enhancement and coping motives) mediated the relationships between a set of psychosocial predictors and alcohol use in an adult sample in Buffalo, New York. In comparison, current findings appear to build on those of Cooper et al.'s (1995) and helped to delineate associations among psychosocial antecedents and drinking motives in a firefighter/EMT sample.

Furthermore, current results, which included social factors similar to that of Read et al. (2003), provided outcomes consistent with that of prior research, in that social reinforcement motives, although demonstrated a strong relationship with its predictor variable, did not mediate the relationship between alcohol offers and alcohol use. Read et al. (2003) suggested that social reinforcement motives seem to demonstrate conceptual and statistical overlap with enhancement motives and this could call into question the utility of distinguishing between those two types of drinking motives.

One finding in particular, which did not coincide with Read et al. (2003), demonstrates that the current data acutely enriches understanding of drinking to cope motivations among firefighters/EMTs and additionally coincides with the expectation that coping motives for alcohol use are prevalent among this population. Coping motives, in both cross-sectional models in this study, had approximately 60% of its variance explained, and mediated the relationship between its exogenous variable (tension reduction) and alcohol use, which was not the case in prior research. Thus, coping motives appear to play a central, mediating role in this sample of FF/EMTs. In theory, firefighters are exposed to an inundation of stressors on a daily basis. This is not to say that other populations, such as those in Read et al.'s (2003) study of college students, do not also experience stress or drink to cope. However, our findings point to the possibility that FF/EMT alcohol use may be more directly related to negative reinforcement motives than to positive reinforcement/social motives—a conceptualization that needs to be further expounded upon and researched.

### **Limitations and Conclusions**

Findings from the current study offer valuable information regarding relations among correlates of drinking, drinking motives, and alcohol use in a FF/EMT population. There was an inclusion of three exogenous variables (occupational stress, sense of brotherhood, and relationship satisfaction) to the present study which do not appear to have been examined before in this context, and although they did not supply stronger fit to a mediational model of alcohol use, it is not the suggestion of this research to discard

their contribution to alcohol use in firefighters/EMTs. However, there are several notable limitations to the present study that should be addressed.

First, social reinforcement motives, similar to Read, et al. (2003), added challenges to the interpretation of our findings in that they did not significantly mediate the relationship between its antecedents and alcohol use. As mentioned earlier, although our model may not completely mediate the relationships proposed, social reinforcement motives should be included in future research in order to further assess the social influences interacting with alcohol use.

Second, a type of negative reinforcement motive, conformity, which was not assessed in Read et al.'s (2003) study, was assessed in the present research. However, the manner in which conformity motives were addressed may have been flawed. The present study did not use any exogenous variables that had been previously used to predict conformity motives. A new variable, sense of brotherhood, was included which, although it showed high reliability as a variable in general, may not have been the proper exogenous variable to predict conformity motives in a mediational model of alcohol use. Furthermore, the brotherhood variable may have had a restrictive range in the sample, since the sense of brotherhood may have been high for all FF/EMTs in the sample. Future studies examining behaviors among a FF/EMT population may benefit from the inclusion of both our newly constructed brotherhood variable and/or the inclusion of drinking to conform, however, our original hypothesized full mediational model does not support them contributing to a motivational model of alcohol use. Nevertheless, the additional

estimated path from social lubrication to conformity motives showed a significant relationship and conformity motives mediated the relationship between social lubrication and alcohol use. This finding may contribute to future explorations into conformity motives in a mediational model of alcohol use.

Third, theoretically and conceptually, one can possibly understand the insinuation that one's relationship satisfaction can play a role in their level of alcohol use. If individuals are unhappy in a relationship, then they may be more likely to drink than individuals who are satisfied, however, the current data does not support this hypothesis. One possible explanation may be the need for a greater sample size. Another may be the need to use a different measure of satisfaction. The DAS-4, although having high internal consistency in prior research, was not replicated here, ( $\alpha=0.653$ ). Further, the DAS-4 may not provide for an adequate assessment of the association between relationship satisfaction and alcohol use. Lastly, the relationship satisfaction variable, similar to the brotherhood and impulsivity/sensation seeking variables, may have had a restrictive range as most of the sample identified as being in a relationship and may have been similarly satisfied.

One final limitation is with the use of the dependent latent variable in the models examined. It appears that the DDQ-r may not have previously been used as a latent variable in this context. Research using this scale as an outcome variable appeared to have only utilized it as a single manifest variable. It is important to further examine the use of the DDQ-r as a latent variable to confirm that it adequately measures alcohol use.

For example, it is possible that including separate subscales for the four measures of alcohol use, without a latent variable, may have allowed for more meditational links to emerge.

Current findings suggest the importance of distinguishing between positive and negative types of motives for alcohol use in FF/EMTs and underscore the complexity of associations between specific psychosocial antecedents and motives to drink in this population. FF/EMTs drinking behaviors are somewhat unique in comparison to many other types of occupations. Accordingly, the FF/EMT data supports the inclusion of negative emotional factors and the concept of drinking to cope in this population. Lastly, the FF/EMT data offers a start at gaining some insight into etiological pathways to alcohol use in professional FF/EMTs but also indicates challenges in measurement and theory that yet need to be further examined.



## Appendix A

### Demographics

1. What is your age?

18 to 24

25 to 34

35 to 44

45 to 54

55 to 64

65 to 74

75 or older

2. What is your gender?

Male

Female

Other

3. What is your ethnicity? (Please select all that apply.)

American Indian or Alaskan Native

Asian or Pacific Islander

Black or African American

Hispanic or Latino

White / Caucasian

Prefer not to answer

Other (please specify)

4. How many years have you served on the Fire Department?

0-5 years

6-10 years

11-15 years

16-20 years

21 or more years

Relationship

5. Which of the following best describes your current relationship status?

Married

Widowed

Divorced and now single

Divorced and in a new relationship

Separated

In a domestic partnership or civil union

Single, but cohabiting with a significant other

Single, never married

6. How often do you discuss or have you considered divorce, separation, or terminating your relationship?

All the time

Most of the time

More often than not

Occasionally

Rarely

Never

7. In general, how often do you think that things between you and your partner are going well?

All the time

Most of the time

More often than not

Occasionally

Rarely

Never

8. Do you confide in your mate?

All the time

Most of the time

More often than not

Occasionally

Rarely

Never

9. Please choose the answer which best describes the degree of happiness, all things considered, of your relationship.

Perfect

Extremely happy

Very happy

Happy

A little unhappy

Fairly unhappy

Extremely unhappy

INSTRUCTIONS: The following is a list of reasons that some people give for drinking alcohol. Thinking of all the times you drink, how often would you say that you drink for each of the following reasons? If you have never consumed alcohol, please indicate reasons that would be important to you if you did drink.

10. To forget your worries.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

11. Because your friends pressure you to drink.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

12. Because it helps you to enjoy a party.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

13. Because it helps when you feel nervous \* or depressed.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

14. To be sociable.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

15. To cheer up when you are in a bad mood.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

16. Because you like the feeling.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

17. So that others won't kid you about not drinking.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

18. Because it's exciting.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

19. To get high.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

20. Because it makes social gatherings more fun.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

21. To fit in with the group you like.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

22. Because it gives you a pleasant feeling.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always



23. Because it improves parties and celebrations.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

24. Because you feel more self-confident and sure of yourself.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

25. To celebrate special occasions \* with friends.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

26. To forget about your problems.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

27. Because it's fun.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

28. To be liked.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

29. So you won't feel left out.

Almost never/never

Some of the time

Half of the time

Most of the time

Almost always/always

INSTRUCTIONS:

Please base your answers around the past three months.

30. How many times have you been offered a drink?

Never

1-2 times

3-5 times

6-9 times

10 or more times

31. How many times have you been given a drink without asking for it?

Never

1-2 times

3-5 times

6-9 times

10 or more times

32. How many times has someone filled up your drink without asking you if you wanted it filled up?

Never

1-2 times

3-5 times

6-9 times

10 or more times

33. How many times has someone bought you a drink without you asking for it?

Never

1-2 times

3-5 times

6-9 times

10 or more times

INSTRUCTIONS: Read each of the following statement and decide whether it is true as applied to you or false as applied to you. If a statement is true or mostly true, as applied to you, mark the true response "T". If a statement is false or not usually true, as applied to you, mark the false response "F". There are no right or wrong answers and no trick questions.

34. I tend to begin a new job without much advance planning on how I will do it.

True

False

35. I usually think about what I am going to do before doing it.

True

False

36. I often do things on impulse.

True

False

37. I very seldom spend much time on the details of planning ahead.

True

False

38. I like to have new and exciting experiences and sensations even if they are a little frightening.

True

False

39. Before I begin a complicated job, I make careful plans.

True

False

40. I would like to take off on a trip with no preplanned or definite routes or timetable.

True

False

41. I enjoy getting into new situations where you can't predict how things will turn out.

True

False

42. I like doing things just for the thrill of it.

True

False

43. I tend to change interests frequently.

True

False

44. I sometimes like to do things that are a little frightening.

True

False

45. I'll try anything once.

True

False

46. I would like the kind of life where one is on the move and traveling a lot, with lots of change and excitement.

True

False

47. I sometimes do "crazy" things just for fun.

True

False

48. I like to explore a strange city or section of town by myself, even if it means getting lost.

True

False

49. I prefer friends who are excitingly unpredictable.

True

False

50. I often get so carried away by new and exciting things and ideas that I never think of possible complications.

True

False

51. I am an impulsive person.

True

False

52. I like “wild” uninhibited parties.

True

False

INSTRUCTIONS: The following list describes some effects of alcohol. Because alcohol affects people in different ways, we would like to know which of these effects you experience when you drink alcohol. Based on your own drinking experience, indicate how much you expect each of these effects when drinking alcohol. (if you have never consumed alcohol, indicate how you might expect alcohol to affect you if you had several drinks.)

53. Drinking helps me relax.

Not at all



A little bit

Somewhat

Quite a bit

A lot

54. Drinking helps me forget problems at work.

Not at all

A little bit

Somewhat

Quite a bit

A lot

55. Drinking helps me feel better about myself.

Not at all

A little bit

Somewhat

Quite a bit

A lot

56. Drinking helps me forget my worries.

Not at all

A little bit

Somewhat

Quite a bit

A lot

57. Drinking helps me feel more relaxed about sex.

Not at all

A little bit

Somewhat

Quite a bit

A lot

58. Drinking makes me feel more sexy.

Not at all

A little bit

Somewhat

Quite a bit

A lot

59. Drinking makes me do some things better.

Not at all

A little bit

Somewhat

Quite a bit

A lot

60. Drinking makes me feel less shy.

Not at all

A little bit

Somewhat

Quite a bit

A lot

61. Drinking makes it easier to find the right words when I talk to people.

Not at all

A little bit

Somewhat

Quite a bit

A lot

62. Drinking makes me feel more romantic.

Not at all

A little bit

Somewhat

Quite a bit

A lot

63. Drinking helps me to fit in better with the people around me.

Not at all

A little bit

Somewhat

Quite a bit

A lot

64. Drinking makes me feel better when I'm feeling down.

Not at all

A little bit

Somewhat

Quite a bit

A lot

65. Drinking helps me relax when I'm tense.

Not at all

A little bit

Somewhat

Quite a bit

A lot

66. Drinking makes me feel cool.

Not at all

A little bit

Somewhat

Quite a bit

A lot

67. Drinking helps me to calm down when I'm angry.

Not at all

A little bit

Somewhat

Quite a bit

A lot

68. Drinking helps me deal with boredom.

Not at all

A little bit

Somewhat

Quite a bit

A lot

69. Drinking helps me express my opinions and ideas better.

Not at all

A little bit

Somewhat

Quite a bit

A lot

INSTRUCTIONS:

Please indicate how you feel, particularly how bothered you are, about each question as it pertains to your experience at the station. For example, how bothered are you about having a poor diet while eating at the station? Are you not at all bothered, slightly bothered, somewhat bothered, very bothered, or extremely bothered? Please mark one answer.

70. Poor diet.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

71. Discrimination based on gender, ethnicity, or age.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

72. Exposure to anxious or overly demanding coworkers or administrators.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

73. Financial strain due to inadequate pay.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

74. Bothered by not being able to predict or control events.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

75. Concerns about not knowing the latest technology.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

76. Thoughts about past run(s) that have been particularly upsetting/disturbing.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

77. Observing negative effects of stress on coworkers, e.g., illness, alcohol abuse, and  
burnout.

Not at all bothered



Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

78. Dislike of routine paperwork.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

79. Working with a substandard co-employee on emergency incidents or situations.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

80. Conflicts with coworkers and team members.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

81. Disruption of sleep.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

82. Feelings of isolation from family due to work demands and stress.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

83. Concerns about serious personal injury/disablement/death due to work.

Not at all bothered

Slightly bothered

Somewhat bothered

Very bothered

Extremely bothered

INSTRUCTIONS:

The following items are questions regarding Brotherhood. Traditionally, brotherhood signifies what one is willing to do for their brother. It is a solemn oath to face danger and fear and even give one's life, if necessary, for their brother. It is not a matter of receiving but a matter of giving. It is not a matter of avoiding personal accountability, rather a matter of accepting responsibility.

84. I can get what I need out of this brotherhood.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

85. This brotherhood helps me fulfill my needs.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

86. I feel like a member of the brotherhood.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

87. I belong to this brotherhood.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

88. I have a say about what goes on in this brotherhood.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

89. People in this brotherhood are good at influencing each another. I feel connected to this brotherhood.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

90. I feel connected to this brotherhood.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

91. I have a good bond with others in this brotherhood.

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

INSTRUCTIONS FOR RECORDING DRINKING DURING A TYPICAL WEEK IN THE CALENDAR BELOW, PLEASE FILL-IN YOUR DRINKING RATE AND TIME DRINKING DURING A TYPICAL WEEK IN THE LAST 30 DAYS. First, think of a typical week in the last 30 days you. (Where did you live? What were your regular weekly activities? Where you working or going to school? Etc.) Try to remember as accurately as you can, how much and for how long you typically drank in a week during that one month period? For each day of the week in the calendar below, fill in the number of standard drinks typically consumed on that day in the upper box and the typical number of hours you drank that day in the lower box.

92. In a typical week for the last 30 days, how many alcoholic drinks do you have for each particular day of the week.

Rows—Zero drinks 1-2 drinks 2-3 drinks 4-5 drinks 5-6 drinks 7-8 drinks 9 or more drinks

Columns—Monday Tuesday Wednesday Thursday Friday Saturday Sunday

93. In a typical week for the last 30 days, how many hours do you consume alcohol for each particular day of the week?

Rows—Zero 1-2 2-3 4-5 5-6 7-8 9 or more

Columns—Monday Tuesday Wednesday Thursday Friday Saturday Sunday

INSTRUCTIONS FOR RECORDING DRINKING FOR YOUR HEAVIEST DRINKING WEEK IN THE CALENDAR BELOW, PLEASE FILL-IN YOUR DRINKING RATE AND TIME DRINKING DURING YOUR HEAVIEST DRINKING WEEK IN THE LAST 30 DAYS. First, think of your heaviest drinking week in the last 30 days. (Where did you live? What were your regular weekly activities? Where you working or going to school? Etc.) Try to remember as accurately as you can, how much and for how long did you drink during your heaviest drinking week in that one month period? For each day of the week in the calendar below, fill in the number of standard drinks consumed on that day in the upper box and the number of hours you drank that day in the lower box.

94. During your heaviest drinking week over the last 30 days, how many alcoholic drinks do you have for each particular day of the week.

Rows—Zero drinks 1-2 drinks, 2-3 drinks, 4-5 drinks, 5-6 drinks, 7-8 drinks, 9 or more drinks

Columns—Monday Tuesday Wednesday Thursday Friday Saturday Sunday

95. During your heaviest drinking week over the last 30 days, how many hours do you consume alcohol for each particular day of the week?

Rows—Zero hours 1-2 hours 2-3 hours 4-5 hours 5-6 hours 7-8 hours 9 or more hours

Columns—Monday Tuesday Wednesday Thursday Friday Saturday Sunday

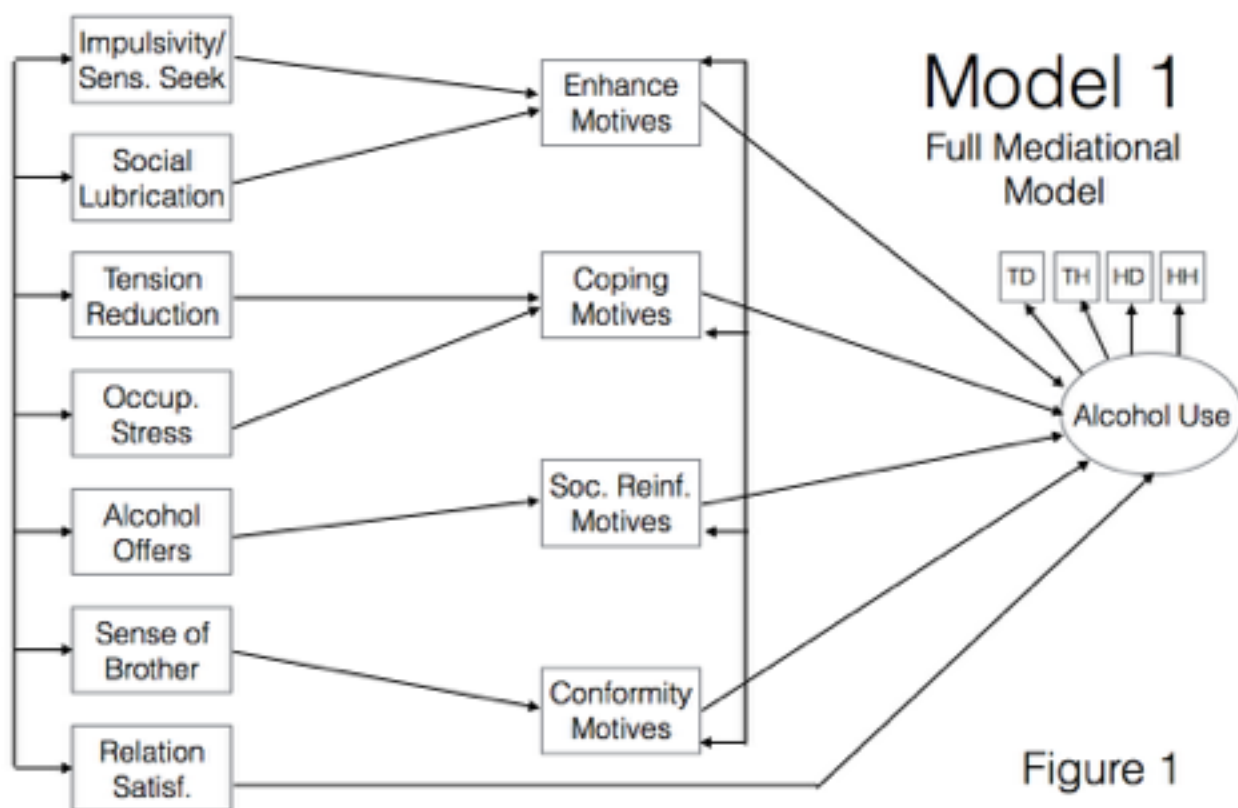


## Appendix B

Variable	Mean	Standard Deviation	Minimum	Maximum	N
Age	43.56	9.34	23	60	205
Years on FD	16.95	9.50	2	37	205
Relationship Satisfaction	12.53	6.06	0	21	205
Enhancement Motives	2.41	0.95	1	5	205
Social Reinforcement Motives	2.97	0.94	1	5	205
Coping Motives	1.72	0.80	1	5	205
Conformity Motives	1.35	0.59	1	5	205
Alcohol Offers	2.61	1.11	1	5	205
Impulsivity and Sensation Seeking	27.96	3.21	22	36	205
Tension Reduction	1.98	0.80	1	5	205
Social Lubrication	1.8	0.75	1	5	205
Occupational Stress	2.64	0.73	1	5	205
Brotherhood	2.08	0.84	1	5	205
Drinks per Typical Week	10.92	10.58	0	52.5	205
Hours per Typical Week	9.33	8.32	0	40.5	205
Drinks per Heavy Week	15.24	13.89	0	63	205
Hours per Heavy Week	12.63	11.76	0	63	205

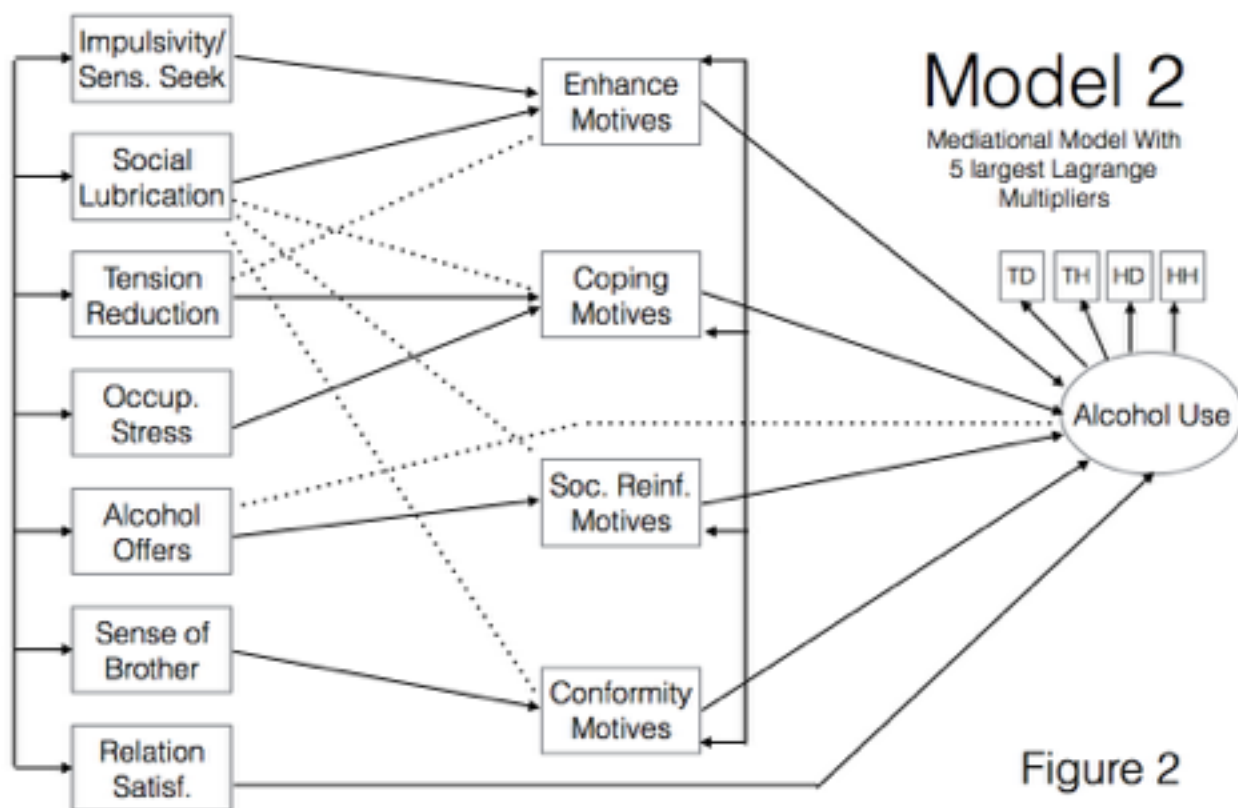
**Figure 1**

*Acronyms for the abbreviated independent variables: Impulsivity/Sens. Seek (Impulsivity/ Sensation Seeking), Occup. Stress (Sources of Occupational Stress), Sense of Brother (Sense of Brotherhood), Relation Satisf. (Relationship Satisfaction); Acronyms for the abbreviated mediator variables: Enhance Motives (Enhancement Motives), Soc. Reinf. (Social Reinforcement Motives)*



**Figure 2**

*Acronyms for the abbreviated independent variables: Impulsivity/Sens. Seek (Impulsivity/ Sensation Seeking), Occup. Stress (Sources of Occupational Stress), Sense of Brother (Sense of Brotherhood), Relation Satisf. (Relationship Satisfaction); Acronyms for the abbreviated mediator variables: Enhance Motives (Enhancement Motives), Soc. Reinf. (Social Reinforcement Motives)*



**Figure 3**

Acronyms for the abbreviated independent variables: *Impulsivity/Sens. Seek* (*Impulsivity/Sensation Seeking*), *Occup. Stress* (*Sources of Occupational Stress*), *Sense of Brother* (*Sense of Brotherhood*), *Relation Satisf.* (*Relationship Satisfaction*); Acronyms for the abbreviated mediator variables: *Enhance Motives* (*Enhancement Motives*), *Soc. Reinf.* (*Social Reinforcement Motives*)

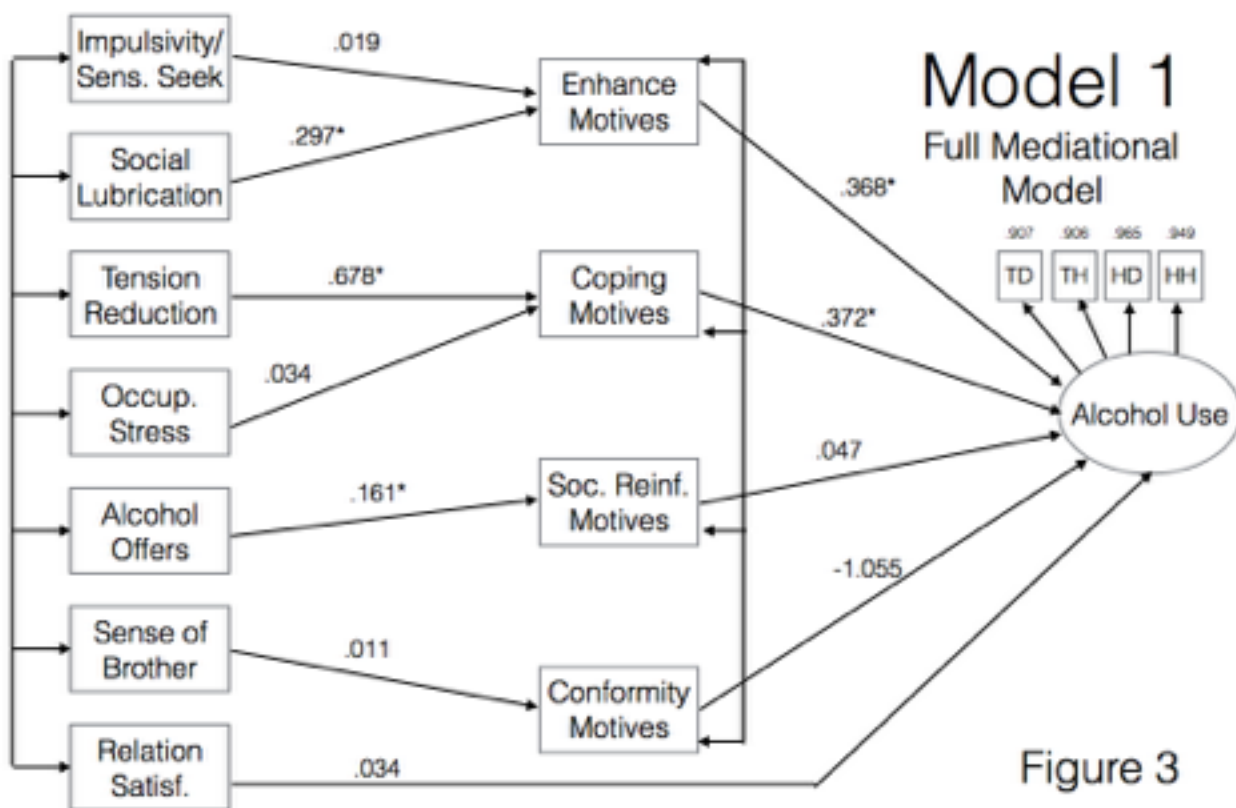
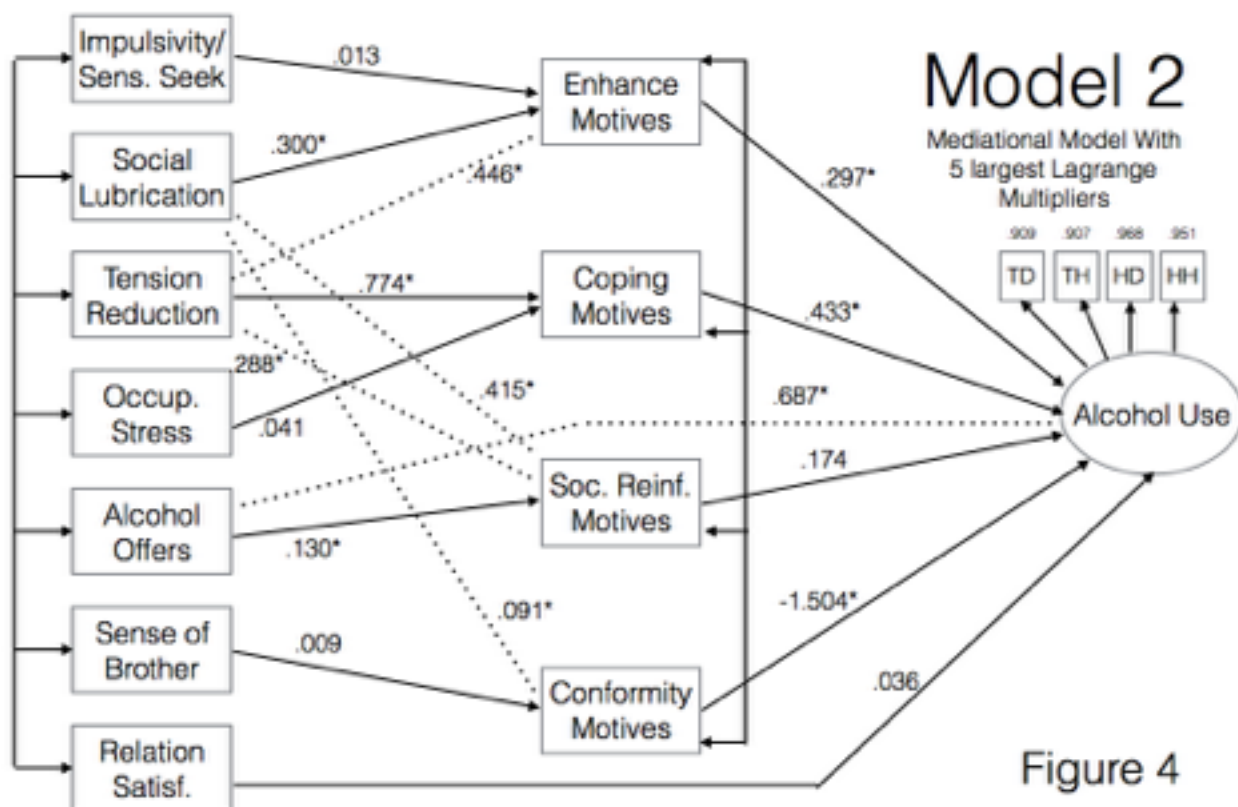
**Figure 3**

Figure 4

Acronyms for the abbreviated independent variables: *Impulsivity/Sens.Seek* (*Impulsivity/Sensation Seeking*), *Occup. Stress* (*Sources of Occupational Stress*), *Sense of Brother* (*Sense of Brotherhood*), *Relation Satisf.* (*Relationship Satisfaction*); Acronyms for the abbreviated mediator variables: *Enhance Motives* (*Enhancement Motives*), *Soc. Reinf.* (*Social Reinforcement Motives*)



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