EXAMINATION OF THE INTERACTION OF DRINKING MOTIVES
AND PERSONALITY ON ALCOHOL USE AND ALCOHOL-RELATED PROBLEMS
AMONG COLLEGE STUDENTS

by

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A Dissertation Submitted to the
University at Albany, State University of New York
in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

School of Education
Division of Counseling Psychology

2011
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on Alcohol Use and Alcohol-Related Problems
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Acknowledgements

Support for this dissertation was provided by the University at Albany Dissertation Research Fellowship Award, the Initiatives for Women Karen R. Hitchcock New Frontiers Fund Award, and the University at Albany Benevolent Association Research Grant.

This research is the culmination of clinical and research training and professional experiences through which I have learned a great deal not only about my topic of study, but also about myself. The degree awarded as a result of this research represents the achievement of a very big dream made possible by enduring passion, determination, and a great deal of hard work that was encouraged and supported by family, friends, faculty, mentors and peers. While at times this journey felt like a solo endeavor, my achievements would not have been possible without the many individuals who believed in me, challenged me, helped me overcome obstacles, and cheered me on along the way.

I would like to thank Dr. Matthew Martens, my research mentor and dissertation chairperson. Without his commitment this research would not have been possible. I am deeply grateful not only for his guidance on this project, but also for his confidence in my research skills and ability to achieve my professional goals, and support in helping me achieve those goals. I am grateful to my co-chairperson Dr. LaRae Jome and committee member Dr. Alex Pieterse who provided thoughtful feedback and valuable insight throughout the process of completing this project. I must also thank Dr. Micki Friedlander, Kerrin Sendrowitz, Andy Kerlow-Myers, Cristina de la Pena Muniz, Dave Kasson, and Mike Siembor for their direction and feedback in the early stages of this research during ECPY 820. Thank you to my cohort (Kerrin, Dave, Jerome, Andy, Cris,
Susana, and Chris) for their friendship and support. Dr. Richard Haase, my primary instructor of research design and statistical analysis, excited and inspired the researcher in me. For that I am grateful.

My friends deserve acknowledgment for bearing with me over the years as I devoted most of my time and energy to academics. I feel lucky to have a number of friends who have been sources of adventure, fun, laughter, motivation, support, and relief throughout these many years of study. I most appreciate the way you all forced me to live life outside of school.

A special thank you to my family for raising me to believe that I could accomplish whatever I set my mind to and providing me with the foundation of unconditional love and unwavering support necessary to dare to achieve all that I can dream. I carry these things wherever I go. My dad, Nicholas, pushed me to excel but reminded me that my best is better than enough; it is great. My mom, Tammy, always available to listen, reassured me by reminding me that tomorrow is another day. Their pride gave me strength and courage during the most trying times. Thank you to my brother, Nicholas, for making me laugh, reminding me to have fun, and proving that one can overcome any challenge. My extended family encouraged me to follow my dreams no matter how far they took me from home. Finally, to my fiancé Michael, I cannot thank you enough for believing in me, inspiring me, supporting me, and partnering with me through the adventures of the past five years. You have done so much to help me love the person I am and aspire to be a better version of myself.

This dissertation is dedicated to my grandmothers Joyce Newell and Winnifred Martin.
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Abstract

Approximately 55% of U.S. college students report binge drinking at least once in the previous two weeks (Core Institute, 2006). Students who engage in binge drinking are more likely to experience academic, social and legal problems as a result of their drinking (e.g., Wechsler et al., 2002). It is important for researchers to investigate factors associated with alcohol use and related problems so that prevention and intervention efforts can be targeted toward those students most at-risk for heavy consumption and alcohol-related problems.

Research has shown that personality factors and drinking motives are associated with alcohol use and alcohol-related problems. Some studies suggest that drinking motives mediate the relationship between personality and alcohol use and alcohol-related problems (e.g. Kuntsche et al., 2008). The specific combinations of personality factors and drinking motives examined vary widely and findings have been mixed. The lack of consistency in results may be explained in part by personality theorists who propose that personality factors and motives interact to predict behavior (McAdams, 1995; McClelland, 1951).

The present study investigated whether four drinking motives (enhancement, social, coping, and conformity) moderated the relationship between four personality factors (extraversion, neuroticism and the impulsivity-related traits of trait urgency and sensation seeking), and alcohol use and alcohol-related problems among a sample of 181 college students. Results indicated that for alcohol use there were main effects for coping motives, social motives, enhancement motives, and extraversion. Main effects for alcohol-related problems were found for coping motives, enhancement motives,
conformity motives, and trait urgency. No statistically significant interaction effects were found.

It appears that both personality characteristics and drinking motives play important, yet distinct roles in predicting alcohol use and alcohol-related problems among college students. It is also possible that the best way to conceptualize the relationships among personality, drinking motives, and alcohol use and alcohol-related problems is through a mediated model as proposed by previous researchers. Findings suggest that prevention and intervention programs should address both personality factors and drinking motives to most effectively help students reduce their alcohol consumption and minimize harmful consequences that can result from drinking.
Chapter I

Introduction

Recent studies indicate that approximately 80% of college students consume at least some alcohol in a given year (Johnston, O’Malley, Bachman, & Schulenberg, 2005; Wechsler et al., 2002). More alarming is the number of students who report engaging in heavy episodic or binge drinking, generally defined as at least four or more drinks for women and five or more drinks for men in one sitting (Wechsler & Nelson, 2001). Approximately 55% of U.S. college students reported engaging in binge drinking at least once in the two weeks prior to completing the survey (Core Institute, 2010), and as many as 84% of college students reported a heavy or binge drinking episode within the preceding 90 days (Vik, Carrello, Tate, & Field, 2000).

Students who engage in heavy episodic drinking are more likely than other students to experience problems like academic difficulties, unwanted or unsafe sexual activity, and trouble with police or campus authorities as a result of their drinking (e.g., Wechsler, Lee, Kuo, & Lee, 2000; Wechsler et al., 2002). Wechsler, Davenport, Dowdall, Moeykens, and Castillo (1994) found that frequent binge drinkers were 25 times more likely than non-binge drinkers to have experienced five or more alcohol-related consequences such as missing class, falling behind in schoolwork, doing something that they regretted, arguing with friends, engaging in unplanned or unprotected sexual activity, and becoming injured.

Given the magnitude of drinking and alcohol-related problems among college students, heavy drinking in this population is a national public health concern (Hingson et al., 2005; Johnston et al., 2005; Wechsler et al., 2002). It is important for researchers to
focus on the factors associated with heavy alcohol use and alcohol-related problems among college students so that those most at-risk for heavy consumption and problems related to their use can be identified. Identifying at-risk students allows for prevention efforts and targeted treatment. The present study will examine specific personality traits and drinking motives in relation to alcohol consumption and alcohol-related problems.

**Personality Factors, Alcohol Use and Alcohol-Related Problems**

An array of personality variables have been explored in relation to alcohol use outcomes. Researchers have identified a number of personality factors associated with alcohol use and alcohol-related problems. Three traits that have frequently been associated with alcohol use and problems among adult and college student populations are neuroticism, extraversion and impulsivity.

High neuroticism, characterized by a proneness to experience psychological distress, cravings, urges and maladaptive coping strategies (Costa & McCrae, 1992; Piedmont, 1998), has been associated with heavy drinking and alcohol-related problems among clinical (e.g. McCormick, Dowd, Quirk & Zegarra, 1998) and non-clinical samples (e.g. Jackson & Sher, 2003; Kuntsche, Fischer & Gmel, 2008; Read & O’Connor, 2006; Ruiz, Pincus & Dickinson, 2003; Stewart, Loughlin & Rhyno, 2001). For example, Ruiz et al. found significant associations between neuroticism, alcohol use and alcohol-related problems among a sample of non-clinical college students. Stewart et al. (2001) also noted a significant relationship between neuroticism and alcohol-related problems among undergraduate students. The connection between neuroticism and alcohol use may be explained in part by the tendency for those high on neuroticism to experience negative emotions. It is possible that individuals experiencing negative affect
may turn to alcohol in an attempt to “self-medicate” or cope with psychological distress, whereas such a maladaptive coping response may be less likely among individuals who tend to experience less subjective distress. In fact, research has demonstrated that college students who drink to cope with distress or expect drinking to reduce stress or tension consume more alcohol, more frequently than those without such motives or expectancies (Cooper, Agocha, & Sheldon, 2000; Lewis & O’Neill, 2000; Stewart et al., 2001).

Additionally, mood disorders such as anxiety and depression, two of the facet scales that help define neuroticism, have been associated with greater alcohol use (Grant et al., 2004; Swendsen & Merikangas, 2000) and alcohol-related problems (Camatta & Nagoshi, 1995). Hence, individuals who report high neuroticism may be experiencing symptoms of anxiety and depression, which may lead to heavy alcohol consumption and alcohol-related problems (Holahan, Moos, Holahan, Cronkite, & Randell, 2003).

High extraversion has also been associated with alcohol use. For example, Martsh and Miller (1997) found that extraversion predicted heavy drinking among a small sample of college students. Similarly, Stewart et al. (2001) found that high extraversion was significantly associated with alcohol-related problems. Individuals who report high extraversion tend to be social and person-oriented, experience positive emotions, and seek excitement (Costa & McCrae, 1992). These individuals may consume more alcohol than others in an attempt to enhance positive affect, increase stimulation, or experience new sensations. Support for this hypothesis can be found in the affect regulation model of alcohol use, which posits that individuals drink to regulate their emotional states by either reducing negative affect or increasing positive affect (Sher & Trull, 1994; Sher, Trull, Bartholow, & Vieth, 1999). Furthermore, research has demonstrated that college students
who drink for social and physical pleasure and to enhance positive emotions tend to consume more alcohol than their peers (Martin & Hoffman, 1993; Stewart & Devine, 2000). Highly sociable, extraverted individuals may also consume alcohol in greater quantities or higher frequencies than their less extraverted peers because they may be more likely to seek out and enjoy parties where in college, drinking is the norm. Indeed, Wechsler, Dowdall, Davenport, Castillo (1995) found that college students who rated parties as being important drank more than other students.

The third personality trait that has demonstrated relationships with alcohol use and negative outcomes is impulsivity. Researchers have defined impulsivity in a number of ways, but it generally refers to the regulation of behavior by emotional processes, with relatively little cognitive control processing such as planning, foresight, or anticipation of consequences (Simons, Carey, & Gahee, 2004). Recent research has shown that impulsivity may not be best conceptualized as a unitary construct, but instead consists of a number of distinct traits such as trait urgency and sensation seeking (e.g. Cyders et al., 2007; Cyders, Flory, Rainer, & Smith, 2009; Magid, MacClean & Colder, 2007; Smith et al., 2007; Whiteside & Lynam, 2001). Specifically, Whiteside and Lynam (2001) established four impulsivity-related traits that are each considered to be unique psychological processes that lead to impulsive behavior: Urgency (defined as the tendency to act rashly when experiencing negative affect), (lack of) Premeditation (defined as the tendency to reflect on consequences of behavior before acting), (lack of) Perseverance (defined as the tendency to remain focused on boring or difficult tasks), and Sensation seeking (defined as the tendency to enjoy and pursue exciting activities and be open to trying new things). These traits resulted from a factor analysis of the four facets
of impulsivity included in the NEO-PI-R along with impulsivity scales taken from 10 other personality instruments. Research has confirmed the factor structure of these traits and demonstrated that each is differentially related to alcohol use and negative consequences (e.g. Smith et al., 2007; Fischer & Smith, 2008).

Impulsivity-related traits have consistently demonstrated relationships with both alcohol use and alcohol-related problems among clinical (e.g. Hopwood et al., 2007; Whiteside & Lynam, 2003) and non-clinical samples (e.g. Camatta & Nagoshi, 1995; Fischer & Smith, 2008; Magid et al., 2007; Simons et al., 2004). Among college students, sensation seeking appears to be most consistently associated with alcohol use and urgency appears to be most consistently associated with alcohol-related problems (e.g. Cyders et al., 2009; Fischer and Smith, 2008; Smith et al., 2007).

The demonstrated relationships among the impulsivity-related traits of urgency and sensation seeking, and alcohol use, and alcohol-related problems make intuitive sense when one considers potential implications of these constructs. It stands to reason that individuals who tend to enjoy and pursue exciting activities (i.e. high sensation seeking) may consume greater amounts of alcohol more frequently than others because they are seeking the stimulation of alcohol or the adventurousness of engaging in a health-risk behavior. Adding to the adventurous nature of drinking for many college students is the illicit nature of alcohol consumption for those under the age of 21. A person high on trait urgency (i.e. tendency to experience strong impulses when experiencing negative affect) may rely on coping methods that can be quickly implemented and provide short-term relief, regardless of the potential negative consequences. With regard to alcohol use, this suggests that such individuals may be
inclined to use alcohol to cope with distress. Individuals high on the trait urgency may have more problems related to their alcohol use because while drinking, they make hasty decisions to act in ways that can be emotionally, physically or socially damaging without considering the negative consequences.

**Drinking Motives, Alcohol Use and Alcohol-Related Problems**

The concept of drinking motives is based on the theoretical assumption that people drink alcohol in order to attain certain valued outcomes, such as changes in affect. These anticipated changes in affect or outcome can be either positively reinforcing (e.g. enhancing positive moods) or negatively reinforcing (e.g. reducing negative affect). Moreover, the source of expected change or outcome can be either internal (a change in one’s own emotional state) or external (changes in the social environment, such as social approval) (Cooper, 1994). Crossing these two dimensions (positive-negative and internal-external), Cooper postulated four distinct motives to drink: to enhance mood or well-being (enhancement: positive, internal), to obtain social rewards (social: positive, external), to avoid or reduce negative emotions (coping: negative, internal), and to avoid social rejection (conformity: negative, external). Thus, drinking motives are said to be directly related to alcohol use and operate according to basic operant principles of motivation (e.g. Skinner, 1953).

Since the inception of Cooper, Russell, Skinner & Windle’s (1992) work on drinking motives, research has shown that these motives are strong predictors of alcohol use and alcohol-related problems among college students. Studies indicate that both positively and negatively reinforcing motives are associated with alcohol use (e.g. Carey & Correia, 1997; Martens, Rocha, Martin & Serrao, 2008; Read, Wood, Kahler,
Maddock, & Palfai, 2003) and that negatively reinforcing motives often have strong relationships with alcohol-related problems (e.g., Carey & Correia, 1997; Cooper, Frone, Russell, & Mudar, 1995). Enhancement motives have demonstrated associations with greater quantities and frequencies of drinking (Cooper et al., 1992; Cooper, 1994) as well as alcohol-related problems (Cooper, 1994). Individuals who drink to cope tend to consume more alcohol and experience more alcohol-related problems (Cooper, 1994). Cooper et al. (1992) found that in comparison to enhancement, social and conformity motives, coping motives were the strongest predictor of alcohol-related problems even after controlling for alcohol consumption. Conformity motives tend to have a direct, albeit weaker relationship with alcohol use and alcohol related problems than the other three motives (e.g. Magid et al., 2007; Martens et al., 2008; Stewart et al., 2001). Finally, social motives, in contrast to the other three motives, tend to be associated with more normative, non-problematic levels of alcohol consumption (Cooper, 1994; Cooper et al., 1992).

Cox and Klinger (1988) proposed that drinking motives are subjectively derived from historical, situational and cognitive antecedents, such as personality factors, drinking peers, and memories of personal experiences. Additionally, specific drinking motives are said to be related to a unique pattern of precursors and consequences. To test Cox and Klinger’s (1988) motivational theory of alcohol use, several researchers have examined the relationships among personality factors (precursors), drinking motives and alcohol use and related problems (consequences), as briefly summarized below.
Personality, Drinking Motives, Alcohol Use and Alcohol-Related Problems

Researchers and theorists have argued that drinking motives are the final common pathway to alcohol use through which more distal influences, such as personality characteristics, exert an influence (Cooper, 1994; Cooper et al., 1995; Cox & Klinger, 1988). For this reason, a number of researchers have assessed drinking motives as mediators of the relationship between various personality characteristics and alcohol use (i.e. that personality traits influence alcohol use indirectly through their influence on drinking motives). However, the results of these studies have been inconsistent. For example, in some cross-sectional studies researchers found that coping motives fully mediated the association between neuroticism and alcohol use (Cooper et al., 2000; Hussong, 2003), whereas others have found only partial mediation of this relationship (Kuntsche, Fischer, & Gmel, 2008; Magid, MacLean, & Colder, 2007; Stewart et al., 2001). Moreover, findings from prospective studies reveal that drinking motives did not mediate alcohol use consistently or in the expected manner. The findings of Read et al.’s (2003) prospective study on college students, for example, diverged from what was expected based on previous cross-sectional research (Cooper et al., 1995, 2000; Stewart et al., 2001). Specifically, in their cross-sectional analyses, Read et al. (2003) found that coping motives partially mediated the relationship between negative affect (similar to neuroticism) and alcohol problems, and enhancement motives were shown to partially mediate the relationship between impulsivity/sensation seeking and alcohol use. In contrast, prospective analyses failed to find evidence of mediation for coping motives in the negative affect-alcohol problems relationship. Similarly, enhancement motives partially mediated the impulsivity/sensation seeking-alcohol use relationship only in the
poorer fitting of the two prospective models tested. Overall, Read et al. (2003) concluded that, “evidence for a mediational role of drinking motives was quite limited in our longitudinal models” (p. 21). The authors also concluded that these findings failed to show the centrality of drinking motives in explaining alcohol use and problems among college students.

It is possible that the equivocal results of studies examining the mediational model of personality and drinking motives in predicting alcohol use and alcohol-related problems is due to the fact that the relationship between personality and drinking motives is not fully accounted for via a mediational framework. Personality theorists suggest that personality and motives are related yet distinct constructs that are both important in predicting behavior (McAdams, 1995; McClelland, 1951). McAdams (1995) discussed the different roles that traits and motives play in explaining behavior by defining traits as being broad and relatively non-conditional constructs, and motives as “terms of future ends” that are “oriented in a particular way in time” (p. 374). Likewise, McClelland (1951) argued that personality traits account for “consistencies and recurrences,” while motives account for “inconsistencies and changes in behavior” (p. 215). From these perspectives, traits and motives interact and have joint effects on behavior. Thus, it is possible that the relationship between personality traits and alcohol use among college students may be impacted or moderated by a third variable: drinking motives.

Although to date researchers have not examined whether personality traits and motives interact to predict drinking behaviors and outcomes, there is some evidence in the literature of personality and motives jointly predicting other constructs. Of the personality factors of interest in the present study, it appears that only extraversion has
been studied in relation to how the trait may interact with motives to predict behavior. Findings from a study examining personality and motives in relation to choice of careers among adult women demonstrated a significant interaction between extraversion and power motivation in predicting which careers women entered (John et al., 1993). John and colleagues also found a significant interaction between extraversion and affiliation motivation in predicting intimate relationship patterns. Winter and colleagues (1998) found prospective evidence of the interaction between personality (extraversion) and motives (affiliation and power) in predicting four different kinds of future behavior in two separate samples of college women. Moreover, the interactive effects of personality traits and motives accounted for more of the variance in behavior than either variable did when considered alone. It is possible that a similar process may occur in the current study. That is, one might expect that individuals characterized by different personality traits may have different motives for consuming alcohol. For instance, given the foundation of drinking motives in operant conditioning principles of reinforcement, it is reasonable to suggest that there may be a stronger relationship between neuroticism (i.e. the tendency to experience negative affect) and alcohol use for individuals who consume alcohol to reduce negative affect (coping motives; negative reinforcement) than for those less motivated to drink to cope with negative emotions. Likewise, the relationship between extraversion (i.e. high sociability) and alcohol use may be stronger for individuals who are also motivated to consume alcohol to obtain social rewards (social motives) than for those less motivated to drink for social reasons. Thus, the present study will examine specific drinking motives as moderators of the relationship between various personality factors, alcohol use and alcohol-related problems.
Statement of the Problem and Hypotheses

Research has shown that various personality factors and drinking motives are associated with alcohol use and alcohol-related problems. However, it is unclear how personality and drinking motives, considered together, promote greater alcohol use and alcohol-related problems. Although some research suggests that drinking motives mediate the relationship between personality and alcohol use and alcohol-related problems (e.g. Cooper et al., 2000; Kuntsche et al., 2008; Magid et al., 2007; Read et al., 2003) the specific combinations of personality factors and drinking motives examined by researchers vary widely, and the findings have been mixed. The lack of consistency in these results may be explained in part by personality theorists who propose that personality traits and motives interact to predict behavior (McAdams, 1995; McClelland, 1951). The general purpose of the present study is to examine an alternate conceptualization of the way in which personality factors and drinking motives are associated with alcohol use and alcohol-related problems. Specifically, four drinking motives (enhancement, social, coping, and conformity) will be examined as moderators of the relationship between four specific personality factors (extraversion, neuroticism, urgency and sensation-seeking), and alcohol use and alcohol-related problems.

The following hypotheses will be tested: In terms of alcohol use, (1) drinking to cope with negative affect (i.e. coping motives) will moderate the relationship between neuroticism and alcohol consumption; (2) drinking to obtain social rewards (i.e. social motives) will moderate the relationship between extraversion and alcohol consumption; (3) drinking to enhance one’s mood (i.e. enhancement motives) will moderate the relationship between urgency and alcohol consumption; and (4) drinking to enhance
one’s mood will moderate the relationship between sensation-seeking and alcohol consumption. More specifically, it is hypothesized that (a) the relationship between neuroticism and alcohol use will be stronger for those with high levels of coping motives versus low levels of coping motives; (b) the relationship between extraversion and alcohol use will be stronger for individuals with high versus low levels of social motives; (c) the relationship between urgency and alcohol use will be stronger for those with high versus low levels of enhancement motives; and (d) the relationship between sensation-seeking and alcohol use will be stronger for those with high versus low levels of enhancement motives. In terms of alcohol-related problems, it is hypothesized that (5) drinking to cope (i.e. coping motives) will moderate the relationship between neuroticism and alcohol-related problems; (6) drinking to avoid social rejection (i.e. conformity motives) will moderate the relationship between extraversion and alcohol-related problems; (7) drinking to enhance one’s mood (i.e. enhancement motives) will moderate the relationship between urgency and alcohol-related problems; and (8) drinking to enhance one’s mood will moderate the relationship between sensation-seeking and alcohol-related problems. More specifically, it is hypothesized that (e) the relationship between neuroticism and alcohol-related problems will be stronger for those with high levels of coping motives versus low levels of coping motives; (f) the relationship between extraversion and alcohol-related problems will be inverse for individuals with high versus low levels of conformity motives; (g) the relationship between urgency and alcohol-related problems will be stronger for those with high versus low levels of enhancement motives; and (h) the relationship between sensation-seeking and alcohol-related problems will be stronger for those with high versus low levels of enhancement motives.
Chapter II

Literature Review

This chapter will provide background information and context relevant to the present study. First, a review of the prevalence and significance of alcohol consumption among college students will be provided. Next, detailed descriptions of the personality traits of interest and the empirical evidence associating personality traits, alcohol use, and alcohol-related problems will be presented. A review of the motivational theory of alcohol use including the role of drinking motives in alcohol consumption and related problems will then be discussed. Finally, potential interactions among personality, drinking motives, alcohol use and alcohol-related problems will be explored.

Prevalence of Alcohol Use

Research consistently demonstrates that the majority of college students report consuming alcohol, many report drinking frequently, and a large proportion report engaging in heavy episodic or binge drinking (defined as four or more drinks in one sitting for women and five or more drinks in one sitting for men). Approximately four out of five of all college students report using alcohol at least once in a given year (Johnston et al., 2005). Alcohol consumption among young men and women is a nation-wide occurrence, and heavy and problematic use is also widespread. A recent study of 71,189 undergraduate students from 134 colleges across the United States found that 71.8% of all students surveyed (66% of whom were underage) reported consuming alcohol at least once in the 30 days prior to being surveyed. The same survey indicated that 55% of college students reported engaging in heavy episodic drinking (defined as consuming five or more drinks in one sitting) at least once in the preceding two weeks (Core Institute,
Another national study \((n = 14,138)\) indicated that of the students who reported engaging in binge drinking, 21.4\% identified themselves as “occasional binge drinkers” (defined as engaging in one to two binge drinking episodes in the previous two weeks), and 22.7\% identified as “frequent binge drinkers” (defined as three or more binge drinking episodes in the preceding two weeks) (Wechsler et al., 2000). Thus, a substantial portion of college students report engaging in heavy drinking.

According to the National Survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration [SAMHSA], 2003) the highest prevalence of problem drinking is among young adults. In fact, over 20 years of research has consistently documented that in comparison to the general population, individuals between the ages of 18 and 24 are the heaviest drinkers and represent the greatest proportion of individuals with diagnosable alcohol-use disorders (O’Malley & Johnston, 2002; U.S. Department of Health and Human Services, 1997). In a large nationwide study, Dawson, Grant, Stinson and Chou (2004) found that approximately 25\% of college students who reported drinking in the past year met the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) (American Psychiatric Association, 1994) criteria for alcohol abuse or dependence in the past year. In a smaller study, Clements (1999) found that in a sample of 306 undergraduate students, approximately 13\% met the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) (American Psychiatric Association, 1994) criteria for alcohol abuse, and 11\% met criteria for alcohol dependence within the past year. Clearly, alcohol use is a major health concern plaguing U.S. college campuses.
Alcohol-Related Consequences

Students who consume alcohol experience a myriad of negative consequences that range from relatively minor to severe. Relatively minor problems associated with alcohol use include missing class or work, falling behind, performing poorly on tests or papers, and receiving poor grades overall. Approximately 25% of students who consume alcohol report having experienced one of the aforementioned consequences as a result of their drinking (Hingson et al., 2005). In a national study (n = 12,708) students who drink reported experiencing the following relatively severe consequences in the past year: blackouts (26.8%), engaging in unplanned sexual activity (21.3%), getting hurt or injured (12.8%), engaging in unprotected sex (10.4%), and getting in trouble with the campus or local police (6.5%) (Wechsler et al., 2002). In a sample of more than 14,000 college students from 128 colleges and universities across the nation, students who identified as “occasional binge drinkers” (defined as engaging in one to two binge drinking episodes in the previous two weeks) were five times more likely than non-binge drinkers to report that they had experienced five or more of twelve different alcohol-related problems. “Frequent binge drinkers” (defined as three or more binge drinking episodes in the preceding two weeks) were 21 times more likely to report five or more alcohol-related problems (Wechsler et al., 2000). Among the most serious consequences of alcohol consumption include thoughts about suicide, suicide attempts, and death. In a large national survey (n = 71,189), 4.5% of students revealed that they had seriously considered suicide and 1.3% confided that they had actually attempted suicide under the influence of alcohol in the past year (Core Institute, 2010). An equally alarming finding from a recent analysis of epidemiological data available on U.S. college students
indicated that 1,825 students lost their lives due to alcohol-related injuries, including traffic accident and other unintentional injuries (Hingson, Zha & Weitzman, 2009).

Unfortunately, heavy drinking endangers not only students who consume alcohol, but also other college students and members of the community at large. Approximately, three out of four non-binge drinkers and abstainers (77%) experience at least one second-hand effect of drinking (Wechsler et al., 2000). For example, in one survey 30% of college students reported being assaulted or humiliated by an intoxicated peer (Wechsler et al., 2002). Additionally, nearly 60% of non-binge drinkers and abstainers reported experiencing an unwanted sexual advance by someone who was intoxicated (Wechsler et al., 2002). Hingson and colleagues (2005) indicated that about 97,000 college students experienced a sexual assault or date rape perpetrated by a college student under the influence of alcohol in 2001 alone, a number consistent with data reported over the past 10 years. Drinking and driving is another serious consequence of alcohol use that can affect drinking and non-drinking college students. Approximately 3.3 million college students (28.9% of those surveyed) drove under the influence of alcohol (Hingson et al., 2009) and more than 3 million students (38.9% of those surveyed) rode as a passenger with a driver who had been drinking (Hingson et al., 2005).

Risky behavior associated with drinking puts many people in danger of serious injury or death. However, drinking and the negative consequences associated with consumption of alcohol have been regarded as the most preventable cause of morbidity and mortality among college students (Wechsler et al., 1995). It is imperative that researchers continue investigating risk factors for heavy alcohol consumption and alcohol-related problems so that future intervention and prevention efforts can be tailored
to help college students most in need. Reducing alcohol use among college students can have a positive impact on individual students as well as the entire campus community.

**Demographic Variables Associated with Alcohol Use and Alcohol-related Problems**

Demographic variables including gender, race/ethnicity, membership in Greek organizations, and religious/spiritual affiliation have been examined as risk and protective factors for heavy alcohol use among college students. There is substantial evidence that gender differences in alcohol consumption exist among college students. Male students tend to drink more heavily and frequently than female students (e.g. Core Institute, 2010; O’Mally & Johnston, 2002; Wechsler et al., 1994). Additionally, male students are more likely to engage in binge drinking (Wechsler et al., 1994; Wechsler et al., 1995). More males than females experience alcohol-related problems and the problems males experience are more severe than those experienced by females (Chartier, Hesselbrock, & Hesselbrock, 2011). Male students are also more likely to meet criteria for alcohol use disorders than female students (Clements, 1999).

Several national studies have found that White college students are at greatest risk for heavy alcohol use and resulting negative consequences. In a review of five national studies of college students O’Malley and Johnston (2002) stated that for the four studies that reported racial/ethnic differences in alcohol use White students consumed more alcohol than students of color. Students who identified as Black/African American consumed the least amount of alcohol and those who identified as Hispanic consumed an intermediate quantity. Consistent with these findings, Chen, Hsiao-ye, Williams and Faden (2009) reported that the 1991–2007 rates of underage drinking in the U.S. were highest for those who identified as White, followed by Hispanic, then Black. In a study
investigating racial differences in alcohol-related problems Native Americans and White students reported experiencing the greatest number of problems. Hispanic students came next in prevalence rates of consequences, followed by Asian and Asian American and Black students who endorsed the fewest consequences (Presley, Meilman & Cashin, 1996). Another study of alcohol-related problems among college students found that White males were at particular risk for experiencing more severe alcohol-related problems (Chartier et al., 2011).

Involvement in fraternities and sororities is another risk factor for binge drinking and negative consequences. A study of over 25,000 students from 61 institutions found that men and women who were members of fraternities and sororities reported a greater quantity and frequency of alcohol consumption and more negative consequences than students who were not affiliated with such organizations (Cashin, Presley & Meilman, 1998). Several smaller scale studies have reported similar findings (e.g. McCabe et al. 2005; Sher, Bartholow & Nanda, 2001; Wechsler et al., 1995).

Religious or spiritual involvement is a protective factor for alcohol use and alcohol-related problems. Research has found that students for whom religious or spiritual beliefs or affiliation is important consume less alcohol less frequently than other students (Wechsler et al., 1995). Patock-Peckham, Hutchinson, Cheong, and Nagoshi (1998) found that students with no religious affiliation tended to drink more heavily and frequently than those with a religious affiliation, but did not experience more alcohol-related problems. Greater frequency of prayer has been associated with less alcohol consumption in observational and experimental studies (Lambert, Fincham, Marks & Stillman, 2010).
Personality Factors, Alcohol Use, and Alcohol-Related Problems

Personality typically refers to characteristic ways of thinking, feeling and acting that are fairly consistent across situations and time. Since the 1930’s researchers have created and tested a multitude of methods for defining, describing and measuring personality traits, many of which use the natural language as a source of attributes from which to create meaningful taxonomies of traits (e.g. Allport & Odbert, 1936). Initial efforts to derive personality traits created categories of terms to describe personality that overlapped substantially and were poorly differentiated (John, Naumann, & Soto, 2008). To remedy this problem, psychologists began using data reduction techniques to produce orthogonal taxonomies of individual differences or traits (e.g. Cattell, 1943; Cattell, Eber, & Tasuoka, 1970). The Big Five (Goldberg, 1981) dimensions of personality were born out of this research. The Big Five is an organization of robust personality factors that reflect a proposed super-ordinate structure of personality (Digman, 1990; Goldberg, 1993). The five factors are: Neuroticism (the tendency to experience negative affect), extraversion (sociability, activity, excitement-seeking, positive emotions), openness to experience (intellectual curiosity, awareness of inner feelings, need for variety in actions), agreeableness (altruism, warmth, helpfulness), and conscientiousness (will to achieve, orderliness, responsibility) (Costa & McCrae, 1992; John, 1990). Factor structures resembling the Big Five have been replicated with numerous variables in many data sets (e.g. Goldberg, 1981, John, 1990). Currently, the five factor model of personality traits is a widely accepted conceptualization of personality and an accumulating body of empirical research supports its reliability and validity. Two of the five factors, neuroticism and extraversion, have been referred to as the “Big Two”
because they are represented as higher-order traits in major taxonomic schemes of personality (John, 1990) and appear in most personality inventories (John & Srivastava, 1999). The addition of impulsivity to neuroticism and extraversion, when these traits are broadly defined, corresponds to “Big Three” models proposed by Eysenck (1970; 1992) and Tellegen (1985) (Cooper et al., 2000). Not only are neuroticism, extraversion, and impulsivity well represented in models of personality, they are also personality traits most frequently associated with alcohol use and alcohol-related problems. Thus, the present study will examine the relationships among neuroticism, extraversion, impulsivity-related traits of urgency and sensation seeking, alcohol use and alcohol-related problems.

Neuroticism. Costa and McCrae (1992) defined the domain of Neuroticism as being composed of six distinct facets: anxiety (tendency to be tense, fearful, worried and apprehensive), angry hostility (tendency to experience anger, frustration and bitterness), depression (tendency to experience feelings of guilt, sadness, hopelessness and loneliness), self-consciousness (tendency to feel shameful, embarrassed and inferior), vulnerability (tendency to feel panicked and unable to cope with stress), and impulsiveness (tendency to be hasty and unable to resist cravings). Individuals with high levels of neuroticism have been described as being prone to experiencing negative emotions, emotional instability, psychological distress, unrealistic expectations, and maladaptive coping responses (Piedmont, 1998).

Neuroticism has been associated with alcohol use, alcohol-related problems, and alcohol use diagnoses among several different populations including adolescents and adult clinical samples. Among adolescents between the ages of 13-19 years \( (n = 2,052), \)
Cooper et al. (2000) found that those who reported high levels of neuroticism tended to engage in heavy drinking ($r = .07$) and experience problems related to their alcohol use ($r = .27$). There is some evidence to suggest that a parental history of alcoholism may predispose adolescents to high levels of neuroticism, as well as increased risk for alcohol use and alcohol abuse. Loukas, Krull, Chassin and Carle (2000) tested this hypothesis among a sample of 337 children whose parents were diagnosed with an alcohol use disorder and 355 matched controls (i.e. no history of parental alcoholism). Results indicated that neuroticism partially mediated the effects of parental alcoholism on adolescent alcohol use disorders. Thus, parental alcoholism was associated with higher levels of neuroticism in their children, which in turn, was associated with alcohol use diagnoses among those adolescents. Based on the aforementioned research, it appears that neuroticism contributes significantly to alcohol use and abuse among adolescents at risk for alcohol use (i.e. those with a familial history of alcoholism) as well as those from the general population.

Studies documenting alcohol use disorders among adult clinical samples have also indicated that neuroticism is significantly associated with such disorders. For example, in a study of 704 adults between the ages of 18 and 45 who were taking part in a longitudinal personality disorder study, neuroticism differentiated individuals who had never had an alcohol use diagnosis from those who had a past diagnosis of such a disorder. The angry hostility facet and the impulsiveness facet of neuroticism further differentiated individuals who had a past diagnosis of an alcohol use disorder from those with a current diagnosis (Hopwood et al., 2007). Other studies investigating the association of personality traits with alcohol use disorders among adult populations have
also demonstrated that those who report higher neuroticism are more likely to be diagnosed with alcohol abuse or alcohol dependence (e.g. Cox, 1985; McCormick et al., 1998; Meszaros, Willinger, Fischer, Schonbeck & Aschauer, 1996).

Findings of the association between neuroticism and alcohol-related outcome variables have been most abundant among college students. Several studies of undergraduate students have identified significant associations between neuroticism and alcohol use and alcohol-related problems. In a study of 86 undergraduate students Hussong (2003) found an association between frequency of drinking and participants who reported high neuroticism ($r = .26$). Ruiz, Pincus and Dickinson (2003) reported similar results among a sample of 200 undergraduate students. In their study, neuroticism significantly predicted both drinking quantity and frequency after controlling for gender ($\Delta R^2 = .03$). Neuroticism was also a significant predictor of alcohol-related problems after controlling for gender ($\Delta R^2 = .08$). Similar findings of a significant relationship between neuroticism and alcohol-related problems ($r = .42$) among college students were reported by Stewart and colleagues (2001). Read and O’Connor (2006) also found that college students ($n = 339$) who reported higher levels of neuroticism were at greater risk for experiencing alcohol-related problems, regardless of their alcohol use. Correlations between neuroticism and alcohol-related problems ($r = .24$) were recently found among a sample of 521 undergraduate students in Spain (Mezquita, Stewart, & Ruipérez, 2010).

While the majority of studies have identified neuroticism as a risk factor for heavy alcohol use, at least two studies have found that neuroticism was a protective factor for alcohol use (i.e. higher neuroticism was associated with less alcohol use). In the same study in which neuroticism was a risk factor for alcohol-related problems, Read and
O’Connor (2006) found neuroticism to be a protective factor for alcohol use. Kuntsche, Fischer and Gmel (2008) also discovered a significant negative relationship between neuroticism and alcohol use among their sample of over 2,000 Swiss college students. These findings are puzzling and suggest that the relationship between neuroticism and alcohol use is complex. Kuntsche et al.’s (2008) findings are based on a Swiss sample of students, whereas most findings of neuroticism as a risk factor have come from studies among American students. Hence, cultural differences may help explain these conflicting results. Another potential explanation for these mixed findings is that individuals who report higher neuroticism may be more likely to experience negative consequences regardless of their alcohol consumption. Since the majority of studies among American college students identify neuroticism as a risk factor for both alcohol use and alcohol-related problems, the present study will hypothesize relationships in a manner consistent with the results of those studies.

In addition to its association with alcohol use and negative consequences, neuroticism has been linked to diagnoses of alcohol use disorders among college students. Larkins and Sher (2006) found a similar pattern of results among college students as Loukas et al. (2000) found among adolescents. Namely, neuroticism among college students was associated with a family history of alcohol use disorders, and was also significantly associated with alcohol use disorders among those students themselves ($r = .17$). Martin and Sher (1994) demonstrated that neuroticism was significantly associated with a diagnosis of alcohol use disorders among a sample of 468 young adults (85% were college students) ($d = .42$). Likewise, in a large sample of over 2,000 undergraduate students, Grekin, Sher and Wood (2006) found that neuroticism
prospectively predicted symptoms of alcohol dependence up to two years after completing the initial survey (β = .09, p < .01). Additionally, neuroticism remained a significant predictor of alcohol dependence symptoms after controlling for symptoms of conduct disorder and comorbid substance use disorder symptoms. Another longitudinal study of 378 college students found that neuroticism was significantly associated with alcohol use disorder diagnoses at baseline and 2, 3, 4, 7, and 11 year follow-up analyses (rs ranged from .14 to .25). Neuroticism also explained a significant portion of the association between alcohol use disorders and psychological distress (Jackson & Sher, 2003). Littlefield, Sher and Wood (2009) have provided perhaps the most notable evidence of the relationship between neuroticism and problematic alcohol use among college students. In a 16 year longitudinal study of over 400 undergraduates, the authors demonstrated that increases in neuroticism over time were associated with increases in problematic alcohol use and symptoms of alcohol dependence over time (rs ranged from .09 to .27). Using latent growth model analysis, Littlefield et al. (2009) also demonstrated that as levels of neuroticism changed with age, so did the magnitude of problematic alcohol use and symptoms of alcohol dependence. Specifically, levels of neuroticism decreased from the ages of 18 to 29 and then leveled off. The same pattern was seen with problematic alcohol involvement and symptoms of alcohol dependence.

In summary, there is substantial evidence in a variety of samples linking neuroticism with alcohol use, alcohol-related problems, and alcohol use disorders, although the effect sizes are generally small. Most studies documenting these relationships have focused on the college student population. Numerous cross-sectional studies and several prospective studies conducted on that population have provided
evidence to suggest that students who are prone to experience negative emotions and distress are more likely to drink frequently, consume more alcohol than their peers, and experience more problems related to their drinking than other students. Students reporting high levels of neuroticism are also more likely to be diagnosed with alcohol use disorders.

**Extraversion.** According to Costa and McCrae (1992) extraversion broadly represents an individual’s need for stimulation, activity and personal interaction, and capacity for joy. Extraversion is comprised of six different facets: warmth (tendency to be affectionate, outgoing and friendly), gregariousness (tendency to enjoy the company of others and seek social contact), assertiveness (tendency to be dominant, confident and decisive), activity (tendency to be energetic and fast-paced, and keep busy), excitement-seeking (tendency to crave excitement and stimulation and take risks), and positive emotions (tendency to be optimistic and experience joy, love and excitement). Individuals with high levels of extraversion tend to be sociable, active and person-oriented, while those with low levels of extraversion tend to be more reserved and quiet, and less active.

Research suggests that extraversion is associated with alcohol use and alcohol-related problems from adolescence through adulthood. For example, Cooper et al. (2000) reported that extraversion was significantly correlated with heavy drinking ($r = .27$), and to a lesser degree, alcohol-related problems ($r = .09$) among adolescents ranging in age from 13 to 19 years. Flory, Lynam, Milich, Leukefeld, and Clayton (2002) investigated the role of personality in predicting alcohol abuse and dependence in a sample of 481 twenty one year old young adults. The results of their study indicated that individuals
higher on extraversion were more likely to be diagnosed with alcohol abuse or
dependence ($\beta = .21$, $p < .01$). Likewise, in a large sample of adults ($n = 1,007$) ranging
in age from 21 to 30 years, Kilby, Downey and Breslau (1998) found that individuals
who developed alcohol dependence over a 3.5 year period scored higher on a measure of
extraversion than individuals who were not diagnosed with alcohol dependence ($d = .17$).
Facets of extraversion as measured by the NEO-PI-R have also been identified as
significant predictors of alcohol use diagnoses in an adult clinical sample. Among
participants in a longitudinal study on personality disorders Hopwood et al. (2007) found
that three of the six facets of extraversion (i.e. warmth, gregariousness, and excitement
seeking) predicted alcohol use diagnoses and differentiated between those who had never
had a diagnosis and individuals with a past alcohol use diagnosis ($d = .34$). While
evidence documenting the association of extraversion with alcohol use and abuse among
adolescents and adults is present in the literature, it is limited. In contrast, research
illustrating significant relationships between extraversion and alcohol outcome variables
among college students is relatively rich. It is possible that the relationship between
extraversion and alcohol use is particularly relevant for the college student population as
compared with younger and older samples.

In an earlier study of college students that looked at the relationships between
three personality characteristics (i.e. extraversion, anxiousness and trait anger) and
alcohol use, Martsh and Miller (1997) found that gender, and all three personality
variables considered together predicted significant proportions of variance in alcohol use,
binge drinking and alcohol-related problems. Based on the findings of follow-up step-
wise regression analyses, Martsh and Miller concluded that extraversion was the single
best predictor of all three alcohol outcome variables \( (R^2 \text{ ranged from } .07 \text{ to } .18) \). Hussong (2003) also reported significant associations between extraversion and alcohol use in a college student population \( (r = .23) \). Similarly, Ruiz et al. (2003) found that the excitement-seeking facet of extraversion was associated with greater levels of drinking and alcohol-related problems in their college student sample \( (rs = .21 \text{ and } .14, \text{ respectively}) \). More recently, Mezquita et al. (2010) found a significant correlation between extraversion and drinks per month in a sample of over 500 Spanish college students. Read and O’Connor (2006) conducted a study among “regular drinking” college students (i.e. individuals who reported consuming alcohol at least once weekly for the past three months) in which participants were asked to answer questions based on imagining consuming either a high or low dose of alcohol. Among those in the low dose group, extraversion was directly related to alcohol use and indirectly related to alcohol problems through its relationship with use. In contrast, for the high dose group, extraversion was only indirectly related to alcohol use and problems through its relationship with positive expectancies. These findings suggest that those who report high levels of extraversion may attend to the positive effects of high doses of alcohol, thus leading to increased alcohol involvement.

In addition to being associated with alcohol use and problems related to alcohol consumption, extraversion has been associated with symptoms of alcohol abuse and dependence as well as diagnoses of alcohol use disorders in college student populations. For example, findings from an ongoing longitudinal study of college health indicated that extraversion was consistently related to symptoms of alcohol dependence from baseline through all four follow-up surveys spanning a two year time period \( (rs \text{ ranged from } .06 \text{ to } .18) \).
to .09). Moreover, extraversion was a significant predictor of alcohol dependence symptoms over time after controlling for gender, conduct disorder symptoms and comorbid substance use disorder symptoms (β = .15, p < .05) (Grekin et al., 2006). Recently, Littlefield et al. (2009) examined the extent to which extraversion, neuroticism, and impulsivity predicted problematic alcohol involvement over a 16 year time period. Results indicated that changes in extraversion were significantly related to changes in problematic alcohol involvement (defined as experience of negative alcohol consequences and reported symptoms of alcohol dependence) over the entire span of the study (rs ranged from .11 to .20).

In sum, among adolescents and adult samples some evidence suggests that extraversion is associated with alcohol outcome variables. A fairly large body of research conducted on college students has indicated that those who report high levels of extraversion are more likely to drink greater amounts of alcohol, use alcohol more frequently, experience more problems related to alcohol use, and report more symptoms of alcohol use disorders than peers lower in extraversion. These findings have been documented cross-sectionally, and over extended periods of time. It seems that extraversion is a trait that is particularly relevant in explaining alcohol use among college student samples. However, effect sizes reported for both cross-sectional and prospective relationships between extraversion and alcohol use and problems have been relatively modest.

Impulsivity-related traits. As briefly described in the introduction of the present study, impulsivity is a multidimensional trait that has been defined and measured differently by various theorists. Impulsivity has been defined using terms such as
impulsivity, sensation seeking, risk-taking, novelty seeking, boldness, adventuresomeness, boredom susceptibility, unreliability, unorderliness, behavioral undercontrol, and disinhibition (Depue & Collins, 1999; Eysenck & Eysenck, 1977; Watson & Clark, 1993). Conceptualizations of impulsivity-related traits have been informed by an assortment of theoretical backgrounds including psychodynamic, trait and temperament, biological process, and cognitive self-regulation models.

While impulsivity-related traits have a multitude of conceptual and operational definitions, they are clearly present in one form or another in several major theories of personality. For example, in Eysenck’s (1970; 1992; Eysenck & Eysenck, 1977) model of personality, the construct of impulsivity is a component of a trait called psychoticism. Zuckerman (e.g., 1971, 1996) referred to the impulsivity construct in his model as “impulsive sensation seeking,” while Tellegen (1985) incorporated a dimension of control versus impulsivity into his model of personality and labeled it “constraint.” Cloninger, Svrakic, and Przybeck (1993) included a factor of novelty seeking that contained items assessing the tendency to behave impulsively in their three part model of temperaments. More recently, Costa and McCrae (1992) included impulsiveness as a facet of neuroticism in their five factor model of personality. Though impulsiveness may be related to neuroticism (r approximately .04 -.12; Littlefield et al., 2009), it has a unique relationship with alcohol use and alcohol-related problems. Hence, it is important that the two constructs be examined separately.

Recent research on impulsivity suggests that the trait should not be defined as a unitary personality trait because evidence suggests that there are several conceptually and empirically distinct impulsivity-related traits that describe unique aspects of personality.
and represent discrete pathways to impulsive behavior (Smith et al., 2007; Whiteside & Lynam, 2001). The measure of impulsivity created by Whiteside and Lynam (2001) called the UPPS Impulsive Behavior Scale is framed within the five factor model of personality. Using exploratory factor analysis the authors discovered four distinct components of impulsivity that each predicts impulsive behavior. The four components, or traits as Whiteside and Lynam (2001) referred to them, assessed by the UUPS are: Urgency (defined as the tendency to experience strong impulses, especially when experiencing negative affect), (lack of) Premeditation (defined as the tendency to reflect on consequences of behavior before acting), (lack of ) Perseverance (defined as the tendency to remain focused on boring or difficult tasks), and Sensation seeking (defined as the tendency to enjoy and pursue exciting activities and be open to trying new things). Smith et al. (2007) set out to confirm the validity of these distinct traits and assess their utility for explaining risky behavior. The results of three separate studies were reported. Confirmatory factor analysis demonstrated that the model postulating Whiteside and Lynam’s four distinct traits provided the best fit to the data. Study 2 provided evidence of convergent and discriminant validity of the four traits. Findings of Study 3 indicated that urgency, premeditation, perseverance, and sensation seeking accounted for different aspects of risky behaviors. More specifically, sensation seeking appeared to relate to the frequency of engaging in risky behaviors, and urgency appeared to relate to problem levels of involvement in those behaviors.

In addition to their inclusion in theories of personality, impulsivity-related traits also have a noticeable presence throughout the fourth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV; American Psychiatric Association,
1994) as criteria for the diagnosis of a number of psychological problems, such as borderline personality disorder, anti-social personality disorder, attention-deficit/hyperactivity disorder, mania, dementia, bulimia nervosa, paraphilias, and substance use disorders (Whiteside & Lynam, 2001). Moreover, an entire section of the DSM-IV is devoted to disorders of impulse-control (e.g. intermittent explosive disorder, pyromania). Findings of the relationship between impulsivity-related traits and alcohol use disorders, as well as nonclinical use of alcohol and the experience of alcohol-related problems, are most pertinent to the present study and will be reviewed below.

Impulsivity-related traits have been associated with alcohol-related clinical diagnoses, symptoms of alcohol use disorders, and an increased risk for developing heavy and problem drinking in clinical and nonclinical adult samples, as well as college student samples. In a longitudinal study conducted on a clinical sample of participants who met criteria for personality disorders, Hopwood et al. (2007) reported that the impulsivity facet of neuroticism successfully discriminated between individuals who had never had a diagnosis of an alcohol use disorder (AUD), and those with past and current AUDs regardless of personality disorder diagnoses ($d = .41$). In a nonclinical sample of women between the ages of 16 and 68 years, Grau and Ortet (1999) found a significant relationship between sensation seeking and both quantity and frequency of alcohol consumption ($rs = .36$ and $.41$, respectively). In a larger longitudinal nonclinical adult sample, Grano, Virtanen, Vahtera, Elovainio and Kivimaki (2004) reported that in addition to being concurrently related to alcohol use, impulsivity was also associated with an increased risk of becoming a heavy drinker two years later. Verdejo-Garcia, Bechara, Recknor, and Perez-Garcia (2007) found that trait urgency was the best predictor of the
severity of medical, employment, alcohol, drug, family/social, legal and psychiatric problems in individuals with substance use disorders, explaining 13–48% of the total variance of these indices. Furthermore, urgency scores alone correctly classified 83% of the participants diagnosed with substance dependence. Similar findings of associations between impulsivity-related traits and alcohol use and alcohol use diagnoses have been reported among college student samples.

In a review of individual and personality correlates of alcohol use and abuse among college students, one of the most consistent findings was that students who reported higher levels of a general personality dimension called “impulsive expression/sensation seeking” drank greater quantities of alcohol, more frequently, and with more negative consequences than other students (Brennan, Walfish & AuBuchon, 1986). Since those findings were summarized in 1986, the relationships among impulsivity-related traits and alcohol use and negative consequences have been replicated consistently in college student populations (Baer, 2002). For example, Simons et al. (2004) sought to determine whether impulsivity and affective lability were risk factors for alcohol-related problems in a sample of 592 undergraduates. They found that impulsivity was significantly associated with alcohol use ($r = .22$) and alcohol-related problems ($r = .30$) (even after controlling for gender and frequency of use). Several other cross-sectional studies among college students have documented that students who report high levels of impulsivity-related traits drink more and experience more negative consequences as a result of their use than those lower in such traits (e.g. Fischer & Smith, 2008; Ruiz et al., 2003; Waldeck & Miller, 1997; Simons, Gahe, Correia, Hansen & Christopher, 2005). Prospective evidence of such relationships has also been reported and
more strongly suggest that impulsivity-related traits may be causally related to alcohol use and related problems.

Simons (2003) examined the same variables as Simons et al. (2004), but used a prospective design. The results of Simon’s (2003) study revealed that reported levels of impulsivity at Time 1 were significantly related to alcohol use and alcohol-related problems at Time 2 (\(r_s = .27\) and .30, respectively) such that those who initially reported high impulsivity reported consuming greater amounts of alcohol and experiencing more alcohol-related problems 30 days later than did individuals who reported lower levels of impulsivity. Simons (2003) concluded that impulsive individuals are particularly vulnerable to the risk of alcohol use and more likely to develop alcohol-related problems than their less impulsive peers. Another longitudinal study revealed that college student participants who initially reported high levels of impulsivity also reported high levels of problematic alcohol involvement at that time (\(r = .28\)) (Littlefield et al., 2009). Furthermore, changes in impulsivity over a 16 year time span corresponded with changes in levels of problematic alcohol involvement. In a discussion of these findings, Littlefield and colleagues (2009) highlighted the importance of tailoring intervention programs to specific personality types and speculated that interventions aimed at changing personality (i.e. decreasing impulsivity) may help reduce problematic drinking among college students.

In light of recent research that suggests that impulsive behavior is better explained by considering at least four distinct impulsivity-related traits (i.e. urgency, premeditation, perseverance, and sensation seeking) rather than one “impulsivity” trait, the present study will focus on those impulsivity-related traits most closely associated with alcohol use and
problems. The results of several studies suggest that among these four traits, urgency and sensation seeking have the most consistent relationships with alcohol use and alcohol-related problems (Cyders et al., 2007; Cyders et al., 2009; Fischer & Smith, 2008; Smith et al., 2007). Across these studies sensation seeking was associated with alcohol use when controlling for the effects of the other impulsivity-related traits, while urgency was associated with alcohol-related problems in three of the four studies. For example, in a prospective study of 418 freshman students, Cyders et al. (2009) found that when urgency, premeditation, perseverance and sensation seeking were considered together and drinking at Time 1 was accounted for, only sensation seeking predicted increases in the frequency with which first-year college students consumed alcohol ($\beta = .13, p < .05$), and only urgency predicted increases in both the quantity of alcohol consumed ($\beta = .11, p < .05$), and alcohol-related problems ($\beta = .10, p < .05$). In a cross-sectional study Fischer and Smith (2008) also compared the relationships among alcohol use, alcohol-related problems, urgency, sensation seeking, premeditation, and perseverance. Their findings indicated that urgency was most relevant to problematic drinking while sensation seeking predicted variance in frequency of drinking. In contrast to consistent positive relationships among urgency, sensation seeking, alcohol use and negative consequences in studies conducted by Cyders et al. (2007), Cyders et al. (2009), Fischer and Smith (2008) and Smith et al. (2007), perseverance was associated with alcohol use only in the study conducted by Cyders et al. (2007). Premeditation was associated with alcohol use and problem drinking in the Cyders et al. (2007) and Fischer and Smith studies, respectively.
Somewhat contrary to the findings previously presented, a validation study of the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001) found that all four factors of the UPPS were consistently related to alcohol use, and together explained 17% of the variance in alcohol consumption among 481 students (Miller, Flory, Lynam & Leukefeld, 2003). Magid and Colder (2007) also measured impulsivity using the UPPS, but reported that after controlling for gender and age, only the premeditation subscale significantly predicted alcohol use ($\beta = -0.31, p < .01$) while the sensation seeking subscale approached significance ($\beta = 0.12, p < .06$). The other two factors, urgency and perseverance, were unique predictors of alcohol-related problems ($\beta = 0.23, p < .01$ and $\beta = -0.16, p < .01$, respectively). Despite these contradictory findings, the majority of research that has examined urgency, sensation seeking, premeditation and perseverance as predictors of alcohol use and alcohol-related problems converge in their findings of sensation seeking and urgency as predictors of alcohol use and alcohol-related problems, respectively. For this reason, sensation seeking and urgency will be examined in the present study.

In conclusion, impulsivity is a broadly defined personality trait that has been associated with a variety of psychiatric diagnoses, alcohol use and alcohol dependence. More recent research indicates that impulsivity is a broad and complex construct more accurately defined by unique impulsivity-related traits. Among such impulsivity-related traits are sensation seeking and urgency, which have been consistently, albeit relatively modestly, related to alcohol use and alcohol-related problems, in concurrent and prospective studies among college students. These relationships may be due to the tendency for individuals with high levels of trait urgency to act rashly without thinking of
potential negative consequences of their behavior and those who self-report high sensation seeking to seek out new and exciting experience such as using alcohol.

**Drinking Motives, Alcohol Use and Alcohol-Related Problems**

It is important to assess one’s motivations to drink in order to deter heavy drinking and mitigate potential problems associated with alcohol use. Cox and Klinger (1988) presented a motivational model of alcohol use to help explain how motivations to drink may be related to other antecedents of alcohol use, as well as alcohol consumption itself. From the perspective of Cox and Klinger (1988), people make decisions about consuming or not consuming alcohol based on whether they perceive the positive affective consequences they expect to get from drinking as outweighing those they expect to experience from not drinking. The affective consequences may be due to direct chemical effects of alcohol on mood, which are generally described as reducing tension or enhancing mood, or indirect effects such as increased sociability or peer acceptance. Many people are unaware of their decisional process. In fact, in most cases the decisions about drinking are unconscious and automatic. Nonetheless, the decision to drink is still voluntary (Cox & Klinger, 1988). According to their model, motivations to use alcohol are the final common pathway to consumption through which other factors, such as past experiences, the environment and personality, exert their influence. Hence, the decision to consume alcohol is influenced by a host of factors including historical factors, current factors, cognitive mediating events and expected effects (Cox & Klinger, 1988).

Historical factors were defined as variables that have shaped the nature of an individual’s past experiences with alcohol, and include individuals’ biochemical reactivity to alcohol (e.g. genetic predisposition to react positively or negatively to
alcohol), personality characteristics (e.g. neuroticism, extraversion, urgency, sensation-seeking), socio-cultural and environmental influences (e.g. culture-specific drinking styles), and past reinforcements from drinking (e.g. increased positive affect or decreased negative affect). Current factors said to influence one’s decision about whether or not to drink include immediate situational factors (e.g. physical setting, availability of alcohol), and current positive and negative incentives in individuals’ lives. Cognitive mediating events are shaped by historical and current factors, and defined as the thoughts, perceptions and memories that influence an individual’s expectations about the direct and indirect affective changes that may result from consuming alcohol. The final factor that directly leads to drinking or not drinking is the effects an individual expects to obtain from drinking. Cox and Klinger (1988) summarized direct and indirect effects that a person might expect from drinking in four categories: (a) positive affect will be enhanced, (b) positive affect will be reduced, (c) negative affect will be reduced, and (d) negative affect will be intensified. From this summary of expected effects, one can see how the basic principles of reinforcement and operant conditioning work in the motivational model to either reinforce or deter future drinking.

As demonstrated in animal laboratory studies by figures such as Thorndike (1911), Watson (1913), and in studies of human behavior modification by Skinner (1953), positive and negative reinforcement operate in such a way that the consequences of behavior determine the likelihood of the occurrence of that behavior in the future. Theoretically, the addition of, or increase in a positive stimulus in response to a particular behavior will strengthen the behavior (positive reinforcement; see expectancy a above), just as the removal of, or decrease in intensity of a negative stimulus in response to a
particular behavior (negative reinforcement; see expectancy \(d\) above) will also increase the likelihood of that behavior in the future.

In sum, Cox and Klinger (1988) proposed that drinking behavior is motivated by different needs or serves different functions for different people (e.g. to celebrate special occasions or cope with distress), and specific drinking motives are associated with a unique pattern of precursors (e.g. personality characteristics or home environment) and consequences (heavy drinking or problems related to use). In other words, drinking motives represent a subjectively derived decisional framework for alcohol use based on personal characteristics and experiences, environmental factors, situations, and expectancies (Cox & Klinger, 1988). These subjective qualities and characteristics of one’s environment, as well as one’s prior experiences with alcohol and the type of reinforcement expected from consuming or not consuming alcohol, will determine the likelihood that an individual will choose to use alcohol in the future.

Cooper and colleagues (1992) expanded upon Cox and Klinger’s (1988) motivational model of alcohol use to create a measure of specific drinking motives. The measure consisted of three motives (i.e. coping, social and enhancement). Cooper (1994) revised their initial measure to include a fourth motive, conformity. The revised measure aligned with the expected effects summarized in Cox and Klinger’s (1988) model. Specifically, the motivational model conceptualized the source of anticipated changes in affect as being internal (e.g. change in emotional state) or external (e.g. change in environment) and as having the potential to be positively or negatively reinforcing. Crossing these two dimensions of expectancies (internal/external and positive/negative), Cooper (1994) proposed four distinct drinking motives: enhancement (internal, positively
reinforcing; drinking to enhance positive mood or well-being), social (external, positively reinforcing; to obtain social rewards), coping (internal, negatively reinforcing; to attenuate negative affect), and conformity (external, negatively reinforcing; to avoid social rejection). Theoretically, the aforementioned motives drive an individual’s decision about whether or not to consume alcohol. For example, individuals may decide to drink because it makes them feel good or because it helps them fit in with peers or manage symptoms of anxiety or depression. Drinking motives have been shown to predict alcohol use and alcohol-related problems among college students, and unique patterns of drinking and consequences have been associated with each motive.

In the initial study of Cooper et al.’s (1992) measure of drinking motives, enhancement, social and coping motives accounted for a total of 15% of the variance in the quantity of alcohol consumption, and 26% of the variance in the frequency of consumption in a sample of approximately 1,200 adults (mean age = 43 years). All three motives explained a significant amount of variance in alcohol use, but enhancement motives were the strongest predictor. In contrast, coping motives were the strongest predictor of all three indices of problematic alcohol use, even after controlling for alcohol consumption. Enhancement motives were also a significant predictor of two of the three problem indices, but social motives did not predict problems related to alcohol use despite significant associations with alcohol consumption. The total variance in the three indices of problematic use accounted for by drinking motives ranged from 8% to 14%. Cooper et al. (1992) concluded that these findings supported the motivational theory of alcohol use because each motive appeared to be associated with a unique pattern of consumption and consequences. For example, enhancement motives were strongly
associated with a pattern of frequent, heavy drinking. In contrast, coping motives were associated with frequent, but not substantially heavier drinking, and were more strongly predictive of problematic drinking, despite the heavier consumption associated with enhancement motives.

Cooper (1994) developed the drinking motives measure consisting of four motives (i.e. enhancement, social, coping and conformity) using a sample of over 1,200 adolescents (mean age = 17.3 years). Although the sample in this study was quite different from the sample in the Cooper et al. (1992) study, the results were much the same. The set of four motives considered together accounted for 14% to 20% of the variance in quantity and frequency of alcohol consumption in the previous six months. Enhancement motives were again the strongest predictor of quantity and frequency of consumption. Social and coping motives were also positive predictors of alcohol use, but conformity motives were inversely related to use such that higher levels of conformity motives were associated with less drinking. Drinking motives also accounted for about 20% of the variance in alcohol-related problems. As was the case in Cooper et al.’s (1992) study, coping and enhancement motives, but not social motives, were associated with drinking problems. High levels of conformity motives also predicted greater alcohol-related problems. Coping motives were again the strongest predictor of alcohol-related problems, even after controlling for alcohol use. Conformity motives also predicted problems after controlling for use, but the association between enhancement motives and problems disappeared. This suggests that the relationship between enhancement motives and problems was due only to its relationship with alcohol use.
In her discussion of the results, Cooper (1994) summarized evidence in support of the validity of the four factor model of drinking motives, and concluded that while all four motives share communalities and overlap with one another to some degree, several characteristics appear to distinguish negatively reinforcing motives (i.e. coping and conformity) from positively reinforcing motives (i.e. enhancement and social). Cooper (1994) suggested that negatively reinforcing motives reflected a more maladaptive, pathological type of drinking than positively reinforcing motives. Cooper based these conclusions on the fact that while both negatively and positively reinforcing motives were associated with use, only negatively reinforcing motives were significant predictors of alcohol-related problems after controlling for use. Comparing the different motives in regards to their source, internal vs. external, Cooper stated that internally generated motives (i.e. coping and enhancement) appear to be more strongly associated with quantity and frequency of alcohol consumption than externally generated motives (i.e. conformity and social).

Overall, studies among college students have reported similar findings to Cooper et al. (1992) and Cooper (1994). That is, in general, studies have identified significant relationships among the four drinking motives, alcohol use, and alcohol-related problems. The patterns of drinking and alcohol-related problems associated with each unique motive, though, have varied. For example, Martens, Cox, Beck and Heppner (2003) found results similar to those reported by Cooper (1994) in a sample of college athletes. Specifically, they found that positively and negatively reinforcing motives were all related to alcohol use, but negatively reinforcing motives were more strongly predictive of alcohol-related problems. The authors also found that when alcohol outcome variables
were regressed on drinking motives, the standardized beta weights were significant for only enhancement and coping motives, not social motives. Carey and Correia (1997) also found that negatively reinforcing motives were stronger predictors of alcohol-related problems than positively reinforcing motives. In a study that examined the psychometric properties of the four-factor measure of drinking motives in a college student sample, Martens et al. (2008) reported slightly different results. Similar to previous studies, they found significant associations between all four drinking motives and measures of quantity and frequency of alcohol use. All four motives were also associated with alcohol-related problems. However, Martens and colleagues reported that enhancement and social motives had the strongest relationships with alcohol use, while coping motives alone had the strongest relationship with alcohol-related problems. Consistent with Martens et al. (2008), Neighbors et al. (2004) found that social and enhancement motives had the strongest relationships with the quantity and frequency of alcohol consumption (28% to 44% variance accounted for), and that coping motives were most strongly related to problematic alcohol use (28% variance accounted for).

In contrast to the previously mentioned studies, Hussong (2003) discovered that in a sample of 86 college students, enhancement motives, as opposed to social and coping motives, were the strongest predictor of both alcohol use and alcohol-related problems. All three motives were, however, associated with higher drinking and problems related to drinking. In still another study of college students, Stewart et al. (2001) found that gender moderated the relationships among drinking motives and alcohol outcome variables such that for women, all drinking motives except conformity were associated with the quantity of alcohol consumed, and all four motives were associated with greater alcohol-related
problems. Conversely, for men, only conformity motives were associated with greater alcohol consumption, and all but social motives were related to greater alcohol-related problems. Magid et al. (2007) also found gender differences in their study, but only for the relationship between enhancement motives and alcohol use such that the relationship was stronger for male college students. The authors also found that of the four drinking motives tested, only enhancement motives predicted greater alcohol use, and only coping and conformity motives predicted greater alcohol-related problems, findings similar to those of Cooper (1994). Finally, in a longitudinal study, Read et al. (2003) found that after controlling for significant gender differences only enhancement motives (in comparison with social and coping motives) predicted increased alcohol use. Enhancement motives were also the sole predictor of increased alcohol-related problems over time, although they did so indirectly through heavy alcohol use.

Overall, it appears that while enhancement, coping, social and conformity motives have all been associated with alcohol use, enhancement motives may have the strongest association with alcohol use. Thus, college students who report drinking to feel good or enhance positive emotions may be more likely to engage in frequent and heavy drinking than students who are not motivated to drink for such reasons. In terms of alcohol-related problems, it appears that coping and conformity motives (i.e. negatively reinforcing motives) are the most consistent predictors, despite levels of alcohol use. Therefore, students who report being motivated to drink in order to forget about their problems or fit in with peers may be more likely to experience problems related to their drinking, despite how much they actually drink. The diverse patterns of drinking and alcohol-related problems associated with each motive across studies may be due in part to the use of
different measures of drinking motives across studies. Additionally, insufficient power to
detect small effect sizes of certain relationships may have also influenced results.
Additional research is needed to clarify the specific relationships between drinking
motives, alcohol use, and alcohol-related problems. Further investigation of these
relationships in the college student sample of the present study may provide some clarity.

Personality, Drinking Motives, Alcohol Use, and Alcohol-Related Problems

Cox and Klinger’s (1988) motivational model of alcohol use proposed that
drinking motives are associated with precursors, such as personality factors, that are
unique to each individual. Theorists have also hypothesized that personality factors
influence individuals’ different motivational styles (McCrae & John, 1992). Hence,
researchers have examined the association between various personality factors and
drinking motives, and have included drinking motives in models studying the link
between personality factors and alcohol outcomes (e.g. Cooper et al., 1992; Read et al.,
2003; Stewart & Devine, 2000).

Several studies have investigated the relationships between the personality traits,
drinking motives, and alcohol-related outcomes of interest in the present study. For
example, Stewart and Devine (2000) investigated the associations between the Big Five
personality traits as measured by the Revised NEO Personality Inventory (NEO-PI-R;
Costa & McCrae, 1992) and drinking motives using the Drinking Motives Questionnaire
Revised (DMQ-R; Cooper, 1994) in a sample of 256 undergraduate participants. As
expected, they found that neuroticism was positively correlated with coping and
conformity motives ($r = .38$ and $r = .21$, respectively). Surprisingly, neuroticism was also
positively related to social motives ($r = .20$). Extraversion was found to correlate in the
expected directions with all four drinking motives. Additionally, multiple regression analyses revealed that when examined together as a block, personality traits were significant predictors of enhancement motives ($F(5, 250) = 2.21, p<0.05$) and coping motives ($F(5, 250) = 6.40, p<0.0001$). The block of personality traits failed to predict social and conformity motives. Neuroticism predicted higher coping motives (partial $r = .26, p<.001$) and extraversion predicted higher enhancement motives (partial $r = .13, p<.05$). These findings suggest that individuals who are prone to experiencing negative affect may drink to reduce that negative affect, while individuals who are prone to experiencing positive affect may drink to enhance that positive affect.

Theakston et al. (2004) sought to replicate the findings of Stewart and Devine (2000) using the DMQ-R and an alternate measure of the Big Five, the International Personality Item Pool (IPIP; Goldberg, 1999). In their sample of 733 college students, emotional stability (opposite of neuroticism) was inversely related to coping motives as anticipated. Hence, participants with low emotional stability (similar to high levels of neuroticism) were motivated to consume alcohol to cope with negative affect. Somewhat surprisingly, extraversion was also related to coping motives, as well as enhancement and conformity motives. Regression analyses revealed that after controlling for demographic variables and alcohol use, low emotional stability and low extraversion predicted coping motives. High emotional stability was found to significantly predict conformity motives, and high extraversion predicted enhancement motives. Some of these findings differed from those reported by previous studies, which Theakston et al. attributed to the use of different personality measures from one study to another. Despite slightly different
findings among studies, it appears that personality traits and drinking motives are indeed associated with one another.

In addition to investigations focusing primarily on the correlations between personality traits and drinking motives, studies have examined meditational models in which personality traits were conceptualized as influencing alcohol-related outcomes through their association with drinking motives. Cross-sectional studies have produced mixed results. Stewart et al. (2001), for example, tested coping and enhancement motives as mediators of the relationship between neuroticism and alcohol-related problems in a sample of undergraduate students \((n = 170)\). Results indicated that coping motives served as a partial mediator of the relationship between neuroticism and drinking problems. By contrast, enhancement motives did not mediate the neuroticism-drinking problems relationship. These results were similar across genders. Kuntsche et al. (2008) found slightly different evidence of partial mediation of personality-alcohol use relationships in a sample of 2,090 Swiss college students. Specifically, enhancement motives partially mediated the relationships between extraversion, daily quantity of alcohol use and heavy episodic drinking (defined as five or more drinks in one sitting for men and four or more drinks for women). Additionally, coping motives were found to partially mediate the relationships between neuroticism and daily quantity of alcohol use and heavy episodic drinking. In a study examining relationships among sensation-seeking, drinking motives and alcohol outcomes, Simons et al. (2005) found that sensation-seeking was indirectly associated with alcohol problems through enhancement motives \((b = .66, p < .001)\). The results of other cross-sectional studies that have investigated meditational models have
ranged from full mediation (e.g., Cooper et al., 2000; Hussong, 2003) to partial mediation (e.g. Magid et al., 2007).

There have been at least two prospective studies examining the meditational role of drinking motives in the relationship between personality and alcohol-related outcomes. A study that followed over 400 college students over a 16 year period found that decreases in neuroticism were related to decreases in alcohol use from ages 21 to 35. However, coping motives mediated the relationship between changes in neuroticism and changes in alcohol-related problems over time (Littlefield, Sher & Wood, 2010). The other longitudinal study failed to find evidence of the meditational role of drinking motives and concluded that drinking motives may not be the central determinant of alcohol use and problems (Read et al., 2003). In their longitudinal analysis of the roles of coping and enhancement motives as mediators of the relationships between impulsivity-sensation seeking and negative affect (similar to neuroticism) among 388 college students, Read et al. (2003) failed to find the relationships they hypothesized based on previous research (e.g. Cooper et al., 1995, 2000; Stewart et al., 2001) and their own cross-sectional findings. Specifically, in their cross-sectional models Read et al. found that coping motives partially mediated the negative affect-alcohol problems relationship and enhancement motives partially mediated the impulsivity/sensation seeking-alcohol use relationship. Alternatively, prospective analyses that assessed drinking and alcohol-related problems over a 12 month period while controlling for baseline associations and significant gender effects indicated that coping motives did not mediate the relationship between negative affect and alcohol-related problems. Enhancement motives continued to partially mediate the impulsivity/sensation seeking-alcohol use relationship in the first
prospective model tested. However, in the prospective model that was revised to produce a better fit to the data, enhancement motives no longer mediated the relationship. In their discussion of findings, Read et al. suggested that while drinking motives contribute to alcohol use and problems in college students, they “do not appear to act consistently as central, intervening variables between other psychosocial factors and alcohol involvement variables” (p. 19).

Previous studies examining the relationships among personality traits, drinking motives and alcohol use and problems may have produced inconsistent results because the mediational framework in which they were tested does not fully account for the relationships among these constructs. Theorists have suggested that personality traits and motives are distinct constructs that differentially predict and explain behavior (McAdams, 1995; McClelland, 1951). Traits have been referred to as “stylistic and habitual patterns of cognition, affect, and behavior” (Emmons, 1989, p. 32), while motives have been described as “wishes and desires- states of affairs one would like to bring about (consciously or unconsciously), or in the case of avoidance motives, states of affairs one would like to prevent” (Winter, 1973). More recently, Winter, John, Stewart, Klohn and Duncan (1998) proposed that personality traits provide the structure and resources to implement or constrain the goals specified by motives. Given theories that suggest that behavior is perhaps best explained by considering one’s personality and motivations, as well as the small effect sizes and mixed results documented in studies attempting to explain alcohol use mainly through one’s motivations (i.e. mediated models), it is possible that alcohol use and problems may be more fully understood by examining the interaction of personality traits and drinking motives. That is, drinking
motives may moderate the relationship between personality and alcohol-related outcomes.

No published studies could be found that have tested drinking motives as moderators of the personality-alcohol use and problems relationships. The absence of such studies may be due to the dominant conceptualization of drinking motives as mediators. Interestingly, researchers in areas outside of addictive behaviors have conceptualized motives as moderating relationships between personality and other behaviors. For example, John et al. (1993) investigated the interaction between extraversion and affiliation motivation in relationship difficulty among adult women. The outcome variables were conflicted affiliation (defined as marriage followed by divorce) and self-reported difficulties in relationships. Results indicated that there was a significant interaction between personality and motives in predicting relationship outcome variables. In the same sample, John and colleagues investigated the interaction between extraversion and power motivation in predicting the types of careers women entered. A significant interaction was again reported.

Winter and colleagues (1998) also focused their study on extraversion and affiliation and power motives, but they tested these interactions prospectively among two samples of college women in the context of predicting (a) engagement in volunteer work, (b) combining work and family roles, (c) choice of career, and (d) importance of work relationships. One sample of women (n = 51) were tested during their senior year (mean age = 21) and again at the age of 43. The second sample of women (n = 89) were tested during their first year (mean age = 18) and again when they were 31 years old. For the first sample, results indicated significant interactions between extraversion and affiliation
motivation in predicting volunteer work, and between extraversion and power motivation in predicting the importance of work relationships from Time 1 to Time 2. For the second sample, results indicated significant interactions between extraversion and affiliation motivation in predicting volunteer work, and combining work and family roles, and between extraversion and power motivation in predicting choice of career and importance of work relationships from Time 1 to Time 2. Moreover, the interactive effects of personality traits and motives for both samples accounted for more of the variance in behavior than either variable did when considered alone. The authors concluded that their results supported their basic hypothesis that traits and motives interact to predict behaviors and life outcomes. Unfortunately, no studies investigating relationships of moderation with neuroticism, or impulsivity-related traits could be located.

It is noteworthy that in the studies conducted by John et al. (1993) and Winter et al. (1998) personality, rather than motives, was conceptualized as the moderating variable. This may be due in part to the dominant conceptualization of motives as mediators rather than moderators. However, in the domain of alcohol use it makes sense to attempt to better explain the relationships between personality and alcohol outcome variables by conceptualizing motives as moderators of that relationship. Investigating the function of motives in explaining alcohol use among different types of individuals is important because theoretically, motives may be malleable in response to interventions.

In total, the literature examining the interrelationships of personality, drinking motives, alcohol use, and alcohol-related problems has indicated that personality traits and motives are related and important in predicting alcohol-related outcomes. Some studies have produced evidence to suggest that motives may fully or partially mediate the
personality-alcohol use or alcohol problems relationships. However, results have varied among cross-sectional and longitudinal studies. Such equivocal results may be due to the failure of previous studies to consider the joint impact that personality and drinking motives may have on alcohol use and problems. Cross-sectional and longitudinal studies that have examined the interaction of personality and motives in predicting behaviors outside the area of college student alcohol use have found significant results that support the hypothesis that each construct operates in different ways to predict behavior, making both important to consider together. The same may be true when attempting to predict alcohol use and problems among college students. Investigating drinking motives as moderators of the relatively modest relationships between personality and alcohol-related outcomes may help explain why some students consume more alcohol and experience more alcohol-related problems than others.
Chapter III

Method

The present study examined the relationships among personality variables, drinking motives, and alcohol use and alcohol-related problems. Drinking motives were investigated as potential moderators of the associations between personality and alcohol use and alcohol-related problems.

Design

The present *ex post facto* survey-based study used hierarchical multiple regression analyses to evaluate the role of drinking motives as moderators of the relationships between personality variables and alcohol use and alcohol-related problems. Separate univariate analyses were used in order to test the semi-partial effect of each hypothesized interaction on the outcome variables. Self-reported neuroticism, extraversion, urgency and sensation seeking were the four independent variables included in the model. Neuroticism and extraversion were assessed using the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). Urgency and sensation seeking were assessed using the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001). Drinking motives were examined using the Drinking Motives Questionnaire Revised (DMQ-R; Cooper, 1994).

There were two criterion variables: alcohol use and alcohol-related problems. A composite variable was created to assess alcohol use based on quantity and frequency estimates from the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). The composite variable was comprised of estimates of number of drinks per week, number of binge drinking occasions in the preceding two weeks, and peak number of drinks consumed in any one drinking occasion over the past 30 days. Use of a composite
measure of alcohol consumption allowed for a comprehensive operationalization of the construct while minimizing Type I error. Alcohol-related problems were assessed using total scores on the Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler, Strong & Read, 2005).

Gender and other demographic variables such as age, race/ethnicity, year in school, fraternity/sorority membership and religious/spirituality affiliation were examined as potential covariates as each of the aforementioned has demonstrated associations with alcohol outcome variables. In the present study, gender, religious/spiritual affiliation, and fraternity/sorority membership had significant associations with alcohol use and were therefore included as covariates in analyses in which alcohol use was the criterion variable. Fraternity/sorority membership was also associated with alcohol-related problems and included as a covariate in those analyses in which alcohol-related problems was the criterion variable.

There is considerable evidence that patterns of alcohol use and alcohol-related problems differ between men and women. Specifically, men tend to consume greater quantities of alcohol and consume alcohol more frequently than women. Men also tend to experience more alcohol-related problems than women (Carlucci, Genova, Rubackin, Rubackin, & Kayson, 1993; Clements, 1999). It is fairly commonplace for researchers to examine and include gender as a covariate when examining the relationships among personality, drinking motives and alcohol outcome variables (e.g. Ruiz et al., 2003; Theakston et al., 2004; Trull & Sher, 1994). Prior research has indicated that college students who are members of fraternities or sororities consume greater quantities of alcohol, drink more frequently, and experience more negative consequences than students
who were not affiliated with such organizations (Cashin et al., 1998; McCabe et al. 2005; Sher et al., 2001; Wechsler et al., 1995). Religious or spiritual involvement has been found to be a protective factor for alcohol use and alcohol-related problems such that students for whom religious or spiritual beliefs or affiliation is important consume less alcohol less frequently than other students (Lambert et al., 2010; Patock-Peckham et al., 1998; Wechsler et al., 1995). The present study found relationships among gender, fraternity/sorority membership and religious/spiritual affiliation consistent with the aforementioned studies. Such relationships were accounted for by including the demographic variables as covariates in regression analyses.

**Participants**

Data were collected on 181 undergraduate students at a large, public, university located in the northeastern U.S. Participants were at least 18 years old and reported consuming at least one alcoholic beverage in the 30 days prior to being surveyed. Participants under the age of 18 and those who did not consume alcohol in the previous 30 days were excluded from analysis \((n = 32)\). The mean age of the sample was 20.90 years old \((SD = 3.19)\). The majority of participants were female (70.7%). Racial and ethnic make-up of the sample was as follows: 78.3% Caucasian, 8.9% Black/African American, 6.7% Hispanic/Latino(a), 3.3% Biracial/Multiracial, and 2.8% Asian/Asian American. Forty-one percent of participants were seniors in college, followed by juniors (28.7%), sophomores (15.5%), and freshmen (13.8%).

The required sample size for the present study was calculated via a power analysis with the value of desired power fixed at .80, as recommended by Cohen (1988). Recommendations for conducting a power analysis to plan the necessary sample size for
a desired value of power were followed (c.f. Cohen, 1992). The alpha level for each regression equation was set at .05. The alpha level was not corrected for the number of regressions performed because each analysis was an independent test of a unique hypothesized interaction for each independent variable. A review of the literature assessing the relationships among personality, drinking motives, alcohol use, and alcohol-related problems was conducted in order to determine the estimated effect sizes of the constructs in the present study.

Literature examining significant associations between neuroticism, extraversion and impulsivity-related traits and alcohol use and alcohol-related problems among college students has reported effect sizes ranging from $r^2 = .04$ (impulsivity-related traits) to $r^2 = .18$ (extraversion) (Magid et al., 2007; Martsch & Miller, 1997; Ruiz, Pincus & Dickenson, 2003; Stewart et al., 2001). Effect sizes of significant relationships among drinking motives and alcohol use and alcohol-related problems in college student samples have ranged from $r^2 = .03$ (conformity) to $r^2 = .29$ (enhancement) (Cooper et al., 1995; Martens et al., 2008; Theakston et al., 2004).

The effect size of primary interest to the present study is that of the semi-partial effect of the interaction between personality and drinking motives. No published studies have assessed the interaction between personality traits and drinking motives to predict alcohol use or alcohol-related problems. However, drinking motives have been examined as a moderator variable for the prediction of alcohol use by trait-like variables. For example, Cooper (1994) found significant interactions between drinking motives and age and gender, accounting for approximately 1% to 2% of the variance in alcohol use. Cooper and colleagues (1992) found similar effect sizes for interactions among drinking
motives, gender, and race ($R^2$ change from .01 to .04). Motives have also been examined as moderators of personality in other domains. However, neither the Winter et al. (1998) study, nor the John et al. (1993) study that tested the interactions between extraversion, affiliation motives, and power motives in predicting future behaviors and relationship outcomes, respectively, reported effect sizes for their findings. Further, the data that was presented in both studies was also insufficient for calculating effect sizes. A third source for information on the effect size of interactions was a study that reviewed over 1,700 tests of interactions in the field of Counseling Psychology (Haase, Martens, Ferrier & Corbett, 2005). Haase and colleagues found that the median effect size for those interactions was $\eta^2 = .033$.

Since the main hypotheses were concerned with detecting significant interactions between personality and drinking motives in predicting alcohol outcomes, and because research indicates that tests of interactions have smaller effect sizes than tests of main effects (Haase et al., 2005), the estimated effect size included in the power analysis for the present study was that of the interaction between drinking motives and personality for each of the dependent variables. Due to the smaller effect size of interaction effects, larger samples are needed to attain statistical significance. Hence, use of the effect size for the hypothesized interactions for the power analysis of the present study resulted in a larger estimation of the sample size necessary to test all of the present hypotheses. Based on prior research in the fields of alcohol use specifically, and Counseling Psychology in general, the effect size used to calculate the sample size necessary for the current study was .03. With $\alpha = .05$, an estimated effect size of .03, an estimated full model $R^2$ value of .10 (estimated based on lowest $r^2$ values for simple and interaction effects), and 80%
power to detect the interaction, a sample size of approximately 230 participants would have been optimal. A post-hoc power analysis with the obtained 181 participants was conducted and revealed that the power to detect significant differences in the current study was .70. As described in the results section, it is unlikely that sub-optimal power impacted the interpretation of the findings from the study.

**Measures**

**Big Five Inventory.** The Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; see Appendix A) is a 44-item, self-report questionnaire designed to assess five aspects of personality (i.e. Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism). The BFI was designed to be a brief, easily self-administered instrument that could accurately and reliably assess the Big Five personality traits when fine-grained facet scores are not necessary. Specifically, the BFI was created to assess the Big Five via prototypical definitions of each trait covering a broad range of content. In creating the BFI, John et al. (1991) used the results of John’s (1990) study that synthesized particular interpretations of traits and facets via diverse samples and instruments by various researchers into the core elements of each of the Big Five traits. The BFI was obtained by categorizing a large number of trait descriptors using expert ratings, and verifying the structure through factor analysis.

The resulting BFI is composed of five subscales representing each of the five factors: Openness (10 items), Conscientiousness (9 items), Extraversion (8 items), Agreeableness (9 items), Neuroticism (8 items). Each item is composed of short phrases based on prototypical adjectives used to describe each trait. For example, the extraversion adjective “energetic” was translated into the item “is full of energy,” and the neuroticism
adjective “worry” became the BFI item “worries a lot.” Participants are asked to report the extent to which they agree with each of the 44 statements, beginning with “I am someone who...” Each item is scored on a 5-point scale ranging from 1 (disagree strongly) to 5 (agree strongly). Scale scores are calculated by first recoding reverse-scored items and then calculating the average score of all the items for each scale. For the purposes of the present study, only the Neuroticism and Extraversion subscales were administered.

The BFI has demonstrated adequate reliability and validity in previous studies. For example, among a sample of undergraduate students the extraversion and neuroticism scales demonstrated 8-week test-retest reliability coefficients of .79 and .76, respectively (Rammstedt & John, 2007). John and Soto (2007) reported internal consistency reliabilities for the extraversion and neuroticism subscales to be \( \alpha = .86 \) and .87, respectively, among a sample of over 800 undergraduate students. Similar internal consistency values of these subscales have been reported by other authors as well (e.g., John & Srivastava, 1999; Read & O’Connor, 2006). Internal consistency reliabilities in the present study were .84 for neuroticism and .86 for extraversion.

The BFI has demonstrated construct validity via its convergence with other instruments assessing the Big Five personality traits and by comparing self-report scores with peer-rated scores. To assess its convergent validity, John and Soto (2007) compared the BFI to the NEO-FFI (Costa & McCrae, 1992). Results indicated that the mean correlation for all scales on the BFI and NEO-FFI was \( r = .77 \). The mean correlation corrected for attenuation was \( r = .95 \). Convergence between scales on the BFI and NEO-FFI were moderate to high (\( r = .73 \) for extraversion and \( r = .81 \) for neuroticism).
Convergence scores corrected for attenuation were even higher ($r = .87$ for extraversion and $r = .94$ for neuroticism) (John & Soto, 2007). Another assessment of the construct validity of the BFI was conducted by John, Naumann and Soto (2008) who reanalyzed the data of DeYoung (2006) to obtain validity correlations for BFI self-report ratings compared with the ratings of peers. John and colleagues (2008) found validity correlations of .67 for extraversion and .52 for neuroticism indicating substantial correlations between one’s own perception of her personality and peers perceptions of her personality using the BFI.

**UPPS Impulsive Behavior Scale.** The UPPS Impulsive Behavior Scale (UPPS; Whiteside & Lynam, 2001; see Appendix B) is a 45- item measure of impulsivity that was developed to synthesize the multitude of definitions and measures of impulsivity. Using the Five Factor Model of personality (McCrae & Costa, 1990) as a framework for developing their measure, Whiteside and Lynam (2001) performed a factor analysis on the four NEO-PI-R facets representing impulsivity (i.e. impulsiveness, excitement seeking, self-discipline, and deliberation) and 17 impulsivity scales taken from 10 different personality instruments. Results indicated that a four factor solution that closely corresponded to the four facets related to impulsivity on the NEO-PI-R provided the best fit to the data. The resulting four factors are considered distinct psychological processes that lead to impulsive behavior. The factors are as follows: Urgency, defined as the tendency to commit rash actions when experiencing negative affect (e.g. “When I am upset I often act without thinking”); (lack of) Premeditation, defined as the tendency to act after careful consideration of the consequences (e.g. “My thinking is usually careful and purposeful”); (lack of) Perseverance, defined as the tendency to avoid or endure
boredom in order to persist with a task until completion (e.g. “I finish what I start”); and Sensation seeking, defined as 1) the tendency to enjoy or pursue activities that are thrilling, and 2) an openness to engaging in new activities (e.g. “I’ll try anything once”).

Each of the four UPPS subscales is comprised of 10-12 items for a total of 45 items. Items are scored on a 4-point scale ranging from 1 (agree strongly) to 4 (disagree strongly) such that higher values indicate greater impulsivity. To make all four subscales run in the same direction such that increasing scores = increasing impulsivity, several items on all subscales, except (lack of) premeditation, are reverse-scored. Calculating the mean of items on each subscale puts them all on the same scale and allows for easier comparison of scores among subscales. For the purposes of the present study, only the urgency and sensation seeking scales were administered.

The UPPS has shown adequate reliability in numerous studies. In the initial development of the measure Whiteside and Lynam (2001) reported internal consistencies of .86 (urgency) and .90 (sensation seeking). Subsequently Whiteside, Lynam, Miller and Reynolds (2005) reported similar internal consistencies ranging from .85 (sensation seeking) to .89 (urgency) among an adult client population. Studies examining alcohol use among college students (Magid & Colder, 2007) and a clinical sample of adult alcohol abusers (Whiteside & Lynam, 2003) also revealed internal consistencies ranging from .83 to .89. Test-retest reliability has also been demonstrated. Anestis, Selby, and Joiner (2007) reported the following internal consistencies for the urgency and sensation seeking subscales at Time 1: .91 (urgency) and .91 (sensation seeking). Three to four weeks later internal consistencies at Time 2 were as follows: .89 (urgency) and .90
(sensation seeking). Internal consistencies for the present study were .90 for urgency and .86 for sensation seeking.

Support for the validity of the UPPS has also been demonstrated. Convergent and discriminant validity of the four subscales was shown by Whiteside and Lynam (2001) via correlations of each of the subscales with different facets of the NEO-PI-R. Specifically, urgency was significantly associated with the impulsiveness facet of the NEO-PI-R, while sensation seeking was associated with the excitement seeking facet of the NEO-PI-R. Evidence of the construct validity of the UPPS has also been demonstrated. Magid and Colder (2007) replicated the factor structure of the UPPS using exploratory and confirmatory factor analysis among a sample of undergraduate students. The authors also provided evidence of criterion validity for the UPPS by confirming theoretically and empirically derived differential associations among the subscales and alcohol use and alcohol-related problems. Smith et al. (2007) validated the factor structure of the UPPS among undergraduate students and provided evidence for convergent and discriminant validity of the measure as well.

**Drinking Motives Questionnaire-Revised.** The Drinking Motives Questionnaire Revised (DMQ-R; Cooper, 1994; see Appendix C) is a 20-item instrument that assesses four distinct motives for consuming alcohol: coping, enhancement, conformity, and social motives. Each motive is unique in terms of its source (internal versus external) and manner of reinforcement (positively versus negatively). That is, the coping subscale represents "negative internal" motives, the enhancement subscale represents "positive internal" motives, the conformity subscale "negative external" motives, and the social subscale "positive external" motives. Each subscale contains five items rated on a scale
ranging from 1 (almost never/never) to 5 (almost always/always). The directions ask participants to indicate how often they drink for the following reasons. Sample DMQ-R items include, “To forget about your problems” (coping), “Because it’s fun” (enhancement), “To fit in with a group you like” (conformity), and “To celebrate a special occasion with friends” (social). Total scale scores can range from 20 to 100, and mean scores are computed for each subscale.

Research has demonstrated adequate internal consistency for the DMQ-R among college students. For example, Neighbors, Larimer, Geisner and Knee (2004) found internal consistency scores (Cronbach’s α) ranging from .83 (conformity) to .91 (social). Similarly, MacLean and Lecci (2000) found internal consistency scores ranging from .81 (conformity) to .92 (social). Other studies have also found similar internal consistency values (e.g. Martens et al., 2003). Internal consistencies for each motive in the present study were as follows: Social α = .87; enhancement α = .89; conformity α = .88; coping α = .83.

The construct validity of the DMQ-R has been supported among adolescents and university students. Cooper (1994), for example, conducted a confirmatory factor analysis and reported acceptable fit index values (NFI = .93, CFI = .94, SRMR = .05). Kuntsche, Stewart and Cooper (2008) also found support for the four factor model and provided evidence of structural invariance across U.S., Canadian and Swiss samples of adolescents. Among college students, Martens et al. (2008) also found a good fit for the four factor model (IFI = .92, CFI = .92, RMSEA = .07). Evidence supporting the criterion validity of the DMQ-R has also been reported. For example, Cooper (1994) reported that the four DMQ-R drinking motives were significantly associated with alcohol use and
abuse among an adolescent sample and accounted for between 14% and 26% of the variance in measures of alcohol use and abuse in that sample. Martens and colleagues (2008) found significant associations among drinking motives and alcohol use and alcohol-related problems in a college student sample and reported that the motives accounted for between 1% (conformity) and 17% (enhancement) of the variance in alcohol use measures and from 8% (conformity) to 22% (coping) of the variance in alcohol-related problems.

**Daily Drinking Questionnaire.** The Daily Drinking Questionnaire (DDQ; Collins et al., 1985; see Appendix D) assesses an individual’s typical quantity and frequency of alcohol consumption over a 30 day period. The DDQ is frequently used to measure college students’ alcohol use (e.g., Baer, Kivlahan, Blume, McKnight & Marlatt, 2001; Larimer et al., 2007; Marlatt et al., 1998). The questionnaire provides the standard size of a drink of beer, wine and liquor, and asks individuals to indicate how many drinks they have typically consumed on each day of the week over the previous 30 days. A host of quantity and frequency measures can be calculated from responses. In the present study, the average number of drinks per week was calculated. Two additional questions assessing alcohol consumption were asked. One question assessed individuals’ peak number of drinks consumed in one sitting. An additional question that asked “In the past two weeks, how many times have you had five or more drinks at one sitting (if you are a male), or four or more drinks in one sitting (if you are a female)?” was used to assess binge drinking. Average number of drinks per week, peak drinking and binge drinking were combined to produce an alcohol use composite variable to broadly define the construct of alcohol use and reduce Type I error when conducting analyses. Support for
the validity of using a composite or latent variable in which several measures of alcohol consumption are combined or modeled as indicators to assess overall drinking behaviors can be found in a number of studies on college student drinking (e.g. Larimer et al., 2007; Marlatt et al., 1998; Rutledge & Sher, 2001).

Due to the nature of the items on the DDQ estimates of reliability such as internal consistency are not appropriate for the measure. However, scores on self-report quantity-frequency measures of alcohol use similar to the DDQ (e.g. Quick Drinking Screen; Sobell et al., 2003), have demonstrated significant intraclass correlations (ICC’s) with the timeline follow-back measure (Sobell & Sobell, 1996) of alcohol use, which has well established reliability and validity for assessing retrospective accounts of substance use for periods of up to six months (Carey, Carey, Maisto & Henson, 2004; Fals-Stewart, O’Farrell, Freitas, McFarlin & Rutigliano, 2000). Additionally, research showing that scores on the DDQ decrease in response to alcohol interventions (e.g. Larimer et al., 2007; Marlatt at al., 1998; Martens et al., 2007) and are related to alcohol related problems (e.g. Larimer et al., 2007; Martens et al., 2008) provide evidence of the utility of the DDQ as a sensitive and clinically relevant measure of alcohol use.

**Brief Young Adult Alcohol Consequences Questionnaire.** The Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler, Strong & Read, 2005; see Appendix E) is a measure designed to assess alcohol-related problems experienced by college students. The B-YAACQ is unique in comparison to other frequently used measure of alcohol-related problems (e.g. RAPI; White & Labouvie, 1989) in its development via item response theory methods. Specifically, Rasch model analysis was used to produce a comprehensive and concise measure of alcohol-related problems that is
truly additive in nature (i.e. endorsing one item reflects a relatively equal increase in severity of problems regardless of which other items are endorsed). The B-YAACQ is a brief version of the YAACQ (Read, Kahler, Strong & Colder, 2006) which was created from items on the YAAPST (Hurlbut & Sher, 1992) and Drinkers Inventory of Consequences (DrInC; Miller, Tonigan & Longabaugh, 1995) and is considered to be the most comprehensive measure of alcohol-related problems (Devos-Comby & Lange, 2008). Using Rasch model analysis, Kahler et al. (2005) reduced the initial 48 items of the YAACQ to a 24-item, unidimensional measure that covered a broad range of problem severity, discriminated among relatively mild, moderate and more severe problems and eliminated gender bias found in items on the YAACQ. Sample items of the B-YAACQ include “While drinking I have said or done embarrassing things,” “I have driven a car when I knew I had too much to drink to drive safely,” and “I have felt like I needed a drink after I’d gotten up (that is, before breakfast).” Respondents are asked to indicate whether each item has happened to them in the past 30 days using a “yes/no” dichotomous format. Responses are added to form a total score ranging from 0-24.

The six week test-retest reliability of a version of the B-YAACQ measuring alcohol-related problems over a 30 day period was \( r = .70 \) (Kahler, Hustad, Barnett, Strong & Borsari, 2008). Internal consistency across studies has ranged from \( \alpha = .83 \) to \( .90 \) (Kahler et al., 2005; Martin, Serrao, Rocha & Martens, 2008). The internal consistency of the measure in the present study was .89.

Kahler et al., (2005) found that their data collected among 340 college students was a good fit to the Rasch model and discriminated among levels of severity on the alcohol-related problems continuum, which provides evidence of the construct validity of
the measure. Kahler and colleagues also found that scores on the B-YAACQ were associated with scores on the 48-item YAACQ \( (r = .95) \), quantity and frequency of alcohol consumption and intoxication \( (r_s \text{ ranged from } .32 \text{ to } .46) \) and alcohol-related problems as measured by the RAPI \( (r = .78) \). These findings support the convergent validity of the measure. Martin et al. (2008) found significant correlations between scores on the B-YAACQ and quantity and frequency of alcohol consumption \( (r_s \text{ ranging from } .53 \text{ to } .56) \). Finally, the 30-day B-YAACQ demonstrated sensitivity to changes in drinking six weeks following an intervention (Kahler et al., 2008), which supports its validity as a clinical tool capable of assessing changes in minor to severe alcohol-related problems over time.

**Demographic Questionnaire.** Participants completed a brief demographic questionnaire (see Appendix F) that included questions about age, gender, racial/ethnic origin, socioeconomic status, religious/spiritual beliefs, year in school, and fraternity/sorority involvement. These data were used to describe the sample and in preliminary analyses to determine if any demographic variables should be included in the major analyses as covariates.

**Procedure**

Participants were recruited in undergraduate classrooms. After permission from course instructors was received, the investigator visited classrooms and read a script about the nature of the study, individuals’ rights as participants (i.e. voluntary nature of the study, the right to withdraw at any time, and confidentiality) and incentives for participation. A sign-up sheet was then passed around and students interested in participating provided their email address so that a link to the survey could be sent to
them. The email solicitation sent to interested participants explained the nature of the study, the approximate length of time necessary to complete the survey (i.e. approximately 15 minutes), information about participants’ rights to discontinue the survey at any time without penalty, incentives for participation, and a web link that led directly to the online survey.

As incentive for participation all participants were given the opportunity to enter a raffle for one of ten $100 Visa gift cards. At the end of the survey participants were provided with a link to a separate survey where they could provide their name and contact information in order to be entered into the drawing. Participants were informed that to ensure anonymity and confidentiality, their name and contact information would be kept completely separate from their questionnaire responses.

After clicking on the link that connects to the study’s website, participants were first presented with a consent page containing a brief description of the study and rights as a research participant, as well as the potential benefits and consequences of participation. Before proceeding with the study, participants were asked to click on an icon at the bottom of the page, indicating their informed consent and that they were at least 18 years of age. All participants were then directed to a page that asked them to complete the demographic questionnaire, the BFI, the UPPS Impulsive Behavior Scale, the DMQ-R, the B-YAACQ, and the DDQ.

After participants completed the survey they were directed to a webpage listing helpful campus resources, such as the University Counseling Center and a university-based community clinic, the Psychological Services Center. The page listing these resources also contained a link to a separate survey where participants could provide their
name and contact information if they were interested in being included in the drawing for one of ten $100 Visa gift cards. This method of offering compensation ensured participants’ anonymity and confidentiality because their contact information was maintained separately from their responses to the surveys.

Analyses

First, the data were examined for missing data points and outliers. Tests of the assumptions of independence, linearity, normality, and homoscedasticity were also conducted. Missing data were imputed after assessing the trend and potential effect on primary analyses. Prior to testing the major hypotheses, descriptive analyses were conducted to provide a comparison of the sample with previous college student samples. Specifically, descriptive statistics were generated for participants’ gender, age, race/ethnicity, and year in school, as well as mean alcohol use on the DDQ and alcohol-related problems on the B-YAACQ. Significant bivariate correlations between demographic variables and the study variables were considered for inclusion as covariates in the main analyses.

The major hypotheses of the present study were analyzed using separate hierarchical multiple regression analyses in which the four personality variables, four drinking motives variables, and the specific interactions between personality and motives were examined in relation to the alcohol use composite variable and alcohol-related problems. The interaction terms were created by first centering the personality and drinking motives variables (i.e., put in deviation units by subtracting the sample mean of each variable from each individual raw score; Frazier, Tix, & Barron, 2004) to reduce
multicollinearity among the predictor and moderator variables, and then multiplying the two variables. The regression models that were tested were as follows:

**Equation 1:**  
\[ y_{\text{alcohol use composite}} = A + b_1 \text{gender} + b_2 \text{religion} + b_3 \text{frat/sorority} + b_4 \text{neuroticism} + b_5 \text{coping} + b_6 \text{neuroticism*coping} \]

**Equation 2:**  
\[ y_{\text{alcohol use composite}} = A + b_1 \text{gender} + b_2 \text{religion} + b_3 \text{frat/sorority} + b_4 \text{extraversion} + b_5 \text{social} + b_6 \text{extraversion*social} \]

**Equation 3:**  
\[ y_{\text{alcohol use composite}} = A + b_1 \text{gender} + b_2 \text{religion} + b_3 \text{frat/sorority} + b_4 \text{sensation-seeking} + b_5 \text{enhancement} + b_6 \text{sensation-seeking*enhancement} \]

**Equation 4:**  
\[ y_{\text{alcohol problems}} = A + b_1 \text{frat/sorority} + b_2 \text{neuroticism} + b_3 \text{coping} + b_4 \text{neuroticism*coping} \]

**Equation 5:**  
\[ y_{\text{alcohol problems}} = A + b_1 \text{frat/sorority} + b_2 \text{extraversion} + b_3 \text{conformity} + b_4 \text{extraversion*conformity} \]

**Equation 6:**  
\[ y_{\text{alcohol problems}} = A + b_1 \text{frat/sorority} + b_2 \text{sensation-seeking} + b_3 \text{enhancement} + b_4 \text{sensation-seeking*enhancement} \]

**Equation 7:**  
\[ y_{\text{alcohol problems}} = A + b_1 \text{frat/sorority} + b_2 \text{urgency} + b_3 \text{enhancement} + b_4 \text{urgency*enhancement} \]

For regression equations in which alcohol use was the outcome variable, gender, fraternity/sorority involvement, and religious/spiritual affiliation were entered as covariates on the first step as these variables were significantly associated with alcohol use. The predictor variable (i.e. the specific personality variable) and moderator variable (i.e. the specific drinking motive) were entered on step 2 in order to test the amount of variance uniquely accounted for. Finally, the interaction of the predictor and moderator variables was entered on step 3 to test the amount of variance uniquely contributed by the interaction (Baron & Kenny, 1986). For regression equations in which alcohol-related
problems was the outcome variable, fraternity/sorority involvement was entered as a covariate on step 1 because it was significantly correlated with alcohol-related problems. The predictor and moderator variables were entered on step 2 followed by the interaction of the predictor and moderator variables on step 3. To test the statistical significance of $R^2$ for the first step (covariate), and the $R^2_{\text{change}}$ for the second step (main effects of personality and drinking motives), and third step (interaction effects of personality X drinking motives), the $F$ test was used, with alpha set at .05 for each equation.
Chapter IV

Results

Missing Data

A variety of options were explored to address the problem of missing data. Two hundred sixty nine participants logged on to the survey. Forty seven participants provided no data (which may occur when an individual accesses the online survey but decides not to participate), and were deleted leaving 222 cases. Participants missing data for 25% or more of the survey questions \( (N = 11) \) were also deleted leaving 211 cases. Next, zeros were imputed for missing data on the Daily Drinking Questionnaire (DDQ) if between one and three data points were missing as it appeared that some participants left items blank rather than entering a zero if no alcohol was consumed on a given day. Zeroes were imputed for seven cases; no cases were missing more than three data points on the DDQ. Participants who indicated that they did not consume any alcohol in the past thirty days \( (N = 29) \) were then excluded from the dataset, leaving 182 cases. Finally, data were imputed using the Expectation Maximization (EM) procedure available in SPSS for 23 participants who were missing less than or equal to 10% of the values on any questionnaire (i.e. BFI, UPPS Impulsive Behavior Scale, DMQ-R, and B-YAACQ). This procedure assumes that data are missing randomly and is generally assumed to be the most simple and reasonable approach to imputing missing data (Tabachnick & Fidell, 2007). The procedure is iterative and has two steps for each iteration- expectation and maximization. First, an expectation for the missing value is computed based on the available data and substituted for the missing value. Second, a maximum likelihood estimation is completed on all data as if the missing values had been filled in and when
convergence is achieved, the missing values are filled-in. Results of the EM procedure indicated that data did in fact appear to be missing at random as no statistically significant differences existed between missing values and dependent variables. For all analyses that used measures for which data were not imputed, listwise deletion was used to deal with missing data. No additional participants were excluded.

**Data Screening**

Data were screened for the assumptions of regression (i.e. normality, linearity, and homoscedasticity). In order to assess normality, frequency histograms were created and z-scores were calculated for each variable. For the alcohol use measures (i.e. drinks per week, binge, and peak), which have no upper bound, one case was identified as a univariate outlier ($p < .001$) and was excluded. All other measures included in the study have upper bounds defined by Likert-type scales. For this reason, it was deemed inappropriate to delete univariate outliers as z-scores in excess of 3.38 simply identified participants who selected the highest Likert-value on a particular scale. Selecting the highest Likert-value on any of the scales included in the present study does not suggest erroneous or exaggerated responses, but simply indicates a high level of a particular trait or behavior. Examination of normal probability plots revealed that all study variables were normally distributed except for conformity motives which were moderately positively skewed. Data was screened for the assumptions of linearity and homoscedasticity by examining residual scatterplots. All variables met the assumptions of linearity. There was evidence of heteroscedasticity such that the variance of $Y$ increased as the mean of $Y$ increased. This is a fairly common form of heteroscedasticity and when the extent of this type of heteroscedasticity is not severe, as was the case in the
current study, multiple regression analysis is robust to this type of violation (Tabachnick & Fidell, 2007). Hence, no data transformations were performed.

**Descriptive Statistics**

The average number of drinks consumed per week was 17.39 ($SD = 16.02$). The number of drinks per week ranged from 1 – 94. The average number of drinks per week in the present sample was over three times higher than the national average (5.2 drinks per week) obtained from a sample of over 209,000 college students at two and four-year institutions from 2006 – 2008 (Core Institute, 2010). Unlike the Core Institute sample that did not exclude participants who reported consuming no alcohol, the present study did exclude such participants, which partially explains the higher average. In comparison to a study that recruited participants from the same university as the present study and also excluded non-drinking participants, participants in the present study consumed about 3 drinks per week more on average (17.39 vs. 14.90) (Martens et al., 2008b). The average number of drinks per week in the present study was slightly lower than that reported by 686 judicially referred participants recruited from the same university as the present study (17.39 vs. 18.24) (Martens et al., 2008a). On average participants reported that the most number of drinks they consumed in any one sitting was 8.38 ($SD = 5.44$). The peak number of drinks consumed in one sitting ranged from 1- 30. The average number of binge drinking episodes in the two weeks prior to being surveyed was 2.15 ($SD = 2.29$). Twenty percent of participants engaged in one binge drinking episode and 35% reported three or more binge episodes in past two weeks. The peak number of drinks consumed in one sitting, as well as the number of binge drinking episodes in the present sample were
similar to those reported in the Martens et al. (2008b) study that recruited participants from the same institution.

Participants reported experiencing an average of 5.65 ($SD = 4.93$) alcohol-related problems in the past 30 days. Eighty-eight percent of participants experienced one or more problems and 49% of the sample experienced five or more alcohol-related problems in the past 30 days. The most commonly reported problem was experiencing a hangover (69% endorsed this problem), followed by feeling tired because of drinking (51%), and having done or said embarrassing things while drinking (49%). Thirty seven percent of participants admitted to having taken foolish risks while drinking, 27% endorsed blacking out (i.e., not being able to remember large stretches of time) as a result of drinking, and 22% had passed out from drinking. Somewhat more serious consequences were endorsed relatively frequently by participants; about 15% of participants reported that because of drinking they had been in sexual situations they later regretted, 9% endorsed having had their physical appearance harmed by drinking, and 8% admitted having driven a car when they knew they had too much to drink to drive safely. Signs of physical dependence on alcohol were endorsed in the present sample; 23% reported increased tolerance, and 6% had felt that they needed a drink after waking up. A methodological limitation of many studies examining alcohol-related problems is that relatively few report the proportion of participants who endorse particular consequences. Read et al. (2003) reported similar proportions of students endorsing relatively minor to relatively severe consequences and signs of alcohol dependence. For instance, in the Read et al. sample, 58% reported hangovers, 22% reported being in sexual situations later regretted, 14% reported driving under the influence, 45% of participants reported having blackouts, and 56% reported
increased tolerance. The Core Institute (2010) reported consistently higher percentages of participants who endorsed several consequences similar to those assessed in the current study despite fewer drinks per week in that sample; 35% (versus 27% in the present study) endorsed blacking out while drinking, and 22% (versus 9% in the present sample) reported driving under the influence of alcohol.

The mean level of each personality trait and drinking motive assessed were calculated. On a scale ranging from 1-5 with 5 reflecting higher levels of the trait, the mean level of neuroticism was 2.89 (SD = 0.77). On the same 1-5 scale, the mean level of extraversion was 3.65 (SD = 0.74). One study that assessed personality using the Big Five Inventory among a community sample could be located in order to provide context for the mean level of neuroticism and extraversion reported in the present sample. The mean level of self-reported neuroticism in that sample was 2.37 (SD = 0.72) and 3.46 (SD = 0.78) for extraversion (DeYoung, 2006), which are similar to the levels reported in the current study. The scale for urgency and sensation seeking ranged from 1-4 with 4 indicating higher levels of the trait. Participants’ mean level of urgency was 2.36 (SD = 0.61) and their mean level of sensation seeking was 2.88 (SD = 0.60). Mean levels of urgency and sensation seeking in other samples of college students are similar to those reported in the present study (e.g. Verdejo-García et al., 2007; Whiteside & Lynam, 2003).

Drinking motives were assessed on a scale ranging from 1-5 with higher scores reflecting more frequent endorsement of the motivation to drink. The mean for enhancement motives was 3.08 (SD = 1.15), the mean for social motives was 3.45 (SD = 1.03), the mean for coping motives was 1.93 (SD = 0.87) and the mean for conformity
motives was 1.51 ($SD = 0.79$). The means obtained in the present sample are similar to those reported in other studies that used the DDQ-R to assess motives among college students (e.g. Magid et al., 2007; Stewart & Devine, 2000; Stewart et al., 2001; Theakston et al., 2004).

**Correlations**

Bivariate correlations were calculated between demographic variables and all of the major study variables (see Table 1). Gender, the degree to which participants were involved in a fraternity or sorority, and religious/spiritual affiliation were all significantly, albeit moderately, associated with the alcohol use composite variable ($r_s = .20, -.20,$ and $.17,$ respectively). In contrast, only the degree to which participants were involved in a fraternity or sorority was significantly associated with alcohol-related problems ($r = -.18$). Variables were coded such that for gender, positive values indicate that men are scoring higher than women. For spiritual/religious affiliation, positive values indicate that non-religious/spiritual individuals are scoring higher than those who identify as religious/spiritual. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not at all involved with a fraternity/sorority are scoring higher than those who are more involved. Social, enhancement and coping motives were significantly correlated with alcohol use ($r_s = .41, .49,$ and $.20,$ respectively) while conformity motives were not. Social, enhancement, coping and conformity motives were all associated with alcohol-related problems ($r_s = .39, .43, .49,$ and $.25,$ respectively). All personality traits except neuroticism were correlated with alcohol use ($r = .18, .18, .21$ for extraversion, urgency and sensation-seeking, respectively). In contrast, only neuroticism
(r = .23) and urgency (r = .46) were associated with alcohol-related problems. Alcohol use and alcohol-related problems were strongly correlated (r = .54).

Hierarchical Regression Analyses

**Neuroticism, coping motives and alcohol use.** After controlling for the effects of gender, spirituality/religious affiliation, and fraternity/sorority involvement, step 2 which included main effects for neuroticism and coping motives accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 174) = 4.16, p < .05, \Delta R^2 = .04$. Only coping motives were uniquely associated with the criterion variable, accounting for about 3.6% of the variance in alcohol use. The interaction effect did not account for a significant increase in the explained variance of alcohol use $\Delta F (1, 173) = .99, p = .32, \Delta R^2 = .01$ (see Table 2).

**Extraversion, social motives and alcohol use.** After controlling for the effects of gender, spirituality/religious affiliation, and fraternity/sorority involvement, step 2 which included main effects for extraversion and social motives accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 174) = 21.97, p < .001, \Delta R^2 = .18$. Social motives and extraversion both were uniquely associated with alcohol use, accounting for about 14% and 3% of the variance in alcohol use, respectively. The interaction effect did not account for a significant increase in the explained variance of alcohol use $\Delta F (1, 173) = .00, p = .99, \Delta R^2 = .00$ (see Table 3).
<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>12</th>
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<td>-.10</td>
<td>-.00</td>
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<td>.49**</td>
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<td>.00</td>
<td>.07</td>
<td>.03</td>
<td>.29**</td>
<td>.06</td>
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<td>-.00</td>
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<td>.37**</td>
<td>.09</td>
<td>.56**</td>
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<td>.09</td>
<td>.17*</td>
<td>.03</td>
<td>-.11</td>
<td>-.21**</td>
<td>.29**</td>
<td>.09</td>
<td></td>
<td></td>
<td>(.86)</td>
</tr>
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<td>-.20**</td>
<td>.18*</td>
<td>.41**</td>
<td>.49**</td>
<td>.20**</td>
<td>.09</td>
<td>-.04</td>
<td>.18*</td>
<td>.18*</td>
<td>.21**</td>
<td></td>
<td>(.85)</td>
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<td>13. Problems</td>
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<td>-.18*</td>
<td>.01</td>
<td>.39**</td>
<td>.43**</td>
<td>.49**</td>
<td>.25**</td>
<td>.23**</td>
<td>.12</td>
<td>.46**</td>
<td>.14</td>
<td>.54**</td>
<td>(.89)</td>
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*Note.* **p<.01; *p<.05. Values on the diagonal represent internal consistency estimates. For gender, positive values indicate that men are scoring higher than women. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. For spiritual/religious affiliation, positive values indicate that non-religious/spiritual individuals are scoring higher than those who identify as religious/spiritual.
Table 2

Summary of Hierarchical Multiple Regression Analysis of Neuroticism and Coping Motives Predicting Alcohol Use

<table>
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<tr>
<th>Variable</th>
<th>$B$</th>
<th>$SE$ $B$</th>
<th>$\beta$</th>
<th>$p$</th>
<th>$s_r$</th>
<th>$R^2$</th>
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<tr>
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<td>0.17</td>
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</tr>
<tr>
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<td>.02</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
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<td>-0.19</td>
<td>.01</td>
<td>-0.18</td>
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</tr>
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<tr>
<td>Coping</td>
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<td>0.20</td>
<td>.01</td>
<td>0.19</td>
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<td>.49</td>
<td>-0.05</td>
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<td>0.15</td>
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<td>CopeXNeur</td>
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<td>.32</td>
<td>0.07</td>
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</table>

Note. $s_r$ = semi-partial correlation. $R^2$ = Proportion of variance accounted for by each step. Spirit = spiritual/religious affiliation; Frat = fraternity/sorority membership. Coping = coping motives. CopeXNeur = interaction between coping motives and neuroticism.

For gender, positive values indicate that men are scoring higher than women. For spiritual/religious affiliation, positive values indicate that non-religious/spiritual individuals are scoring higher than those who identify as religious/spiritual. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. $\Delta R^2$ for Step 3 = .01.
Table 3

*Summary of Hierarchical Multiple Regression Analysis of Extraversion and Social Motives Predicting Alcohol Use*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>p</th>
<th>sr</th>
<th>R²</th>
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<td>0.22</td>
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</tr>
<tr>
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<td>.02</td>
<td>0.15</td>
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</tr>
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<td>Frat</td>
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<td>.05</td>
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</tr>
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<td>0.29</td>
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<td>0.39</td>
<td>.00</td>
<td>0.38</td>
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<td>1.97</td>
<td>0.19</td>
<td>.01</td>
<td>0.18</td>
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<tr>
<td><strong>Step 3</strong></td>
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<td>0.29</td>
</tr>
<tr>
<td>SocialXExtra</td>
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<td>1.88</td>
<td>0.00</td>
<td>.99</td>
<td>0.00</td>
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</tr>
</tbody>
</table>

*Note.* sr = semi-partial correlation. Spirit = spiritual/religious affiliation; Frat = fraternity/sorority membership. Social = social motives. SocialXExtra = interaction between social motives and extraversion. For gender, positive values indicate that men are scoring higher than women. For spiritual/religious affiliation, positive values indicate that non-religious/spiritual individuals are scoring higher than those who identify as religious/spiritual. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. \( \Delta R^2 \) for Step 3 = .00.
Urgency, enhancement motives and alcohol use. After controlling for the effects of gender, spirituality/religious affiliation, and fraternity/sorority involvement, step 2 which included main effects for urgency and enhancement motives accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 174) = 27.30, p < .001, \Delta R^2 = .21$. Only enhancement motives were uniquely associated with alcohol use, accounting for approximately 18% of the variance. The interaction effect did not account for a significant increase in the explained variance of alcohol use $\Delta F (1, 173) = .18, p = .67, \Delta R^2 = .00$ (see Table 4).

Sensation seeking, enhancement motives and alcohol use. After controlling for the effects of gender, spirituality/religious affiliation, and fraternity/sorority involvement, step 2 which included main effects for sensation seeking and enhancement motives accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 174) = 27.39, p < .001, \Delta R^2 = .21$. Only enhancement motives were uniquely associated with the criterion variable, accounting for about 19% of the variance in alcohol use. The interaction effect did not account for a significant increase in the explained variance of alcohol use $\Delta F (1, 173) = .34, p = .56, \Delta R^2 = .00$ (see Table 5).

Neuroticism, coping motives and alcohol-related problems. After controlling for the effects of fraternity/sorority involvement, step 2 which included main effects for neuroticism and coping motives accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 177) = 28.63, p < .001, \Delta R^2 = .24$. Only coping motives were uniquely associated with the criterion variable, accounting for about 18% of the variance in alcohol-related problems. The interaction effect did not account for a
significant increase in the explained variance of alcohol-related problems $\Delta F (1, 176) = .13$, $p = .72$, $\Delta R^2 = .00$ (see Table 6).
Table 4

Summary of Hierarchical Multiple Regression Analysis of Urgency and Enhancement Motives Predicting Alcohol Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>( \beta )</th>
<th>p</th>
<th>( \beta )</th>
<th>( R^2 )</th>
</tr>
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<tr>
<td>Gender</td>
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<td>3.08</td>
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<td>.00</td>
<td>0.22</td>
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<tr>
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<tr>
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Note. \( \beta \) = semi-partial correlation. Spirit = spiritual/religious affiliation; Frat = fraternity/sorority membership. Enhancement = enhancement motives. EnhanceXUrg = interaction between enhancement motives and trait urgency. For gender, positive values indicate that men are scoring higher than women. For spiritual/religious affiliation, positive values indicate that non-religious/spiritual individuals are scoring higher than those who identify as religious/spiritual. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. \( \Delta R^2 \) for Step 3 = .00.
Table 5

Summary of Hierarchical Multiple Regression Analysis of Sensation Seeking and Enhancement Motives Predicting Alcohol Use

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<th>Variable</th>
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<th>p</th>
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<th>R²</th>
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<td>.56</td>
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</table>

Note. rs = semi-partial correlation. Spirit = spiritual/religious affiliation; Frat = fraternity/sorority membership. Enhancement = enhancement motives. EnhanceXSS = interaction between enhancement motives and sensation seeking. For gender, positive values indicate that men are scoring higher than women. For spiritual/religious affiliation, positive values indicate that non-religious/spiritual individuals are scoring higher than those who identify as religious/spiritual. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. $\Delta R^2$ for Step 3 = .00.
Table 6

Summary of Hierarchical Multiple Regression Analysis of Neuroticism and Coping Motives Predicting Alcohol-Related Problems

<table>
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<th>Variable</th>
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<th>$p$</th>
<th>$r_s$</th>
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<td></td>
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<td>0.27</td>
</tr>
<tr>
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</table>

Note. $r_s$ = semi-partial correlation. Frat = fraternity/sorority membership. Coping = coping motives. CopeXNeur = interaction between coping motives and neuroticism. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. $\Delta R^2$ for Step 3 = .00.
Extraversion, conformity motives and alcohol-related problems. After controlling for the effects of fraternity/sorority involvement, step 2 which included main effects for conformity motives and extraversion accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 177) = 6.98, p < .001, \Delta R^2 = .07$. Only conformity motives were uniquely associated with alcohol-related problems, accounting for 5.3% of the variance. The interaction effect did not account for a significant increase in the explained variance of alcohol-related problems $\Delta F (1, 176) = .47, p = .49, \Delta R^2 = .00$ (see Table 7).

Urgency, enhancement motives and alcohol-related problems. After controlling for the effects of fraternity/sorority involvement, step 2 which included main effects for urgency and enhancement motives accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 177) = 40.24, p < .001, \Delta R^2 = .30$. Enhancement motives and urgency both were uniquely associated with alcohol-related problems, accounting for 9% and 14% of the variance in alcohol-related problems, respectively. The interaction effect did not account for a significant increase in the explained variance of alcohol-related problems $\Delta F (1, 176) = .47, p = .49, \Delta R^2 = .00$ (see Table 8).

Sensation seeking, enhancement motives and alcohol-related problems. After controlling for the effects of fraternity/sorority involvement, step 2 which included main effects for sensation seeking and enhancement motives accounted for a significant increase in explained variance for alcohol use, $\Delta F (2, 177) = 19.00, p < .001, \Delta R^2 = .17$. Only enhancement motives were uniquely associated with the criterion variable, accounting for approximately 16% of the variance in alcohol-related problems. The
interaction effect did not account for a significant increase in the explained variance of alcohol-related problems $\Delta F(1, 176) = .86, p = .36, \Delta R^2 = .00$ (see Table 9).
Table 7

Summary of Hierarchical Multiple Regression Analysis of Extraversion and Conformity Motives Predicting Alcohol-Related Problems

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>p</th>
<th>sr</th>
<th>R²</th>
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</tr>
<tr>
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<td>-0.16</td>
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</tr>
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</tr>
<tr>
<td>Conformity</td>
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<td>0.24</td>
<td>.00</td>
<td>0.23</td>
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<tr>
<td>Extraversion</td>
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<tr>
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<tr>
<td>ConformXExtra</td>
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<td>.50</td>
<td>-0.05</td>
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</table>

Note. sr = semi-partial correlation. Frat = fraternity/sorority membership. Conformity = conformity motives. ConformXExtra= interaction between conformity motives and extraversion. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. ∆R² for Step 3 = .00.
Table 8

*Summary of Hierarchical Multiple Regression Analysis of Urgency and Enhancement Motives Predicting Alcohol-Related Problems*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>p</th>
<th>sr</th>
<th>R²</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>0.03</td>
</tr>
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<td>.04</td>
<td>-0.13</td>
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<tr>
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<tr>
<td>Enhancement</td>
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<td>.00</td>
<td>0.30</td>
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<tr>
<td>Urgency</td>
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<td>EnhanceXUrg</td>
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</tr>
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</table>

*Note.* sr = semi-partial correlation. Frat = fraternity/sorority membership. Enhancement = enhancement motives. EnhanceXUrg = interaction between enhancement motives and trait urgency. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. ∆R² for Step 3 = .00.
Table 9

Summary of Hierarchical Multiple Regression Analysis of Sensation Seeking and Enhancement Motives Predicting Alcohol-Related Problems

<table>
<thead>
<tr>
<th>Variable</th>
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<th>SE B</th>
<th>β</th>
<th>p</th>
<th>$\bar{r}$</th>
<th>$R^2$</th>
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</tr>
<tr>
<td>Frat</td>
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<td>.10</td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
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<td>0.21</td>
</tr>
<tr>
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<td>.00</td>
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</tr>
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<td>.40</td>
<td>0.06</td>
<td></td>
</tr>
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<td></td>
<td></td>
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<td>0.21</td>
</tr>
<tr>
<td>EnhanceXSS</td>
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<td>-0.06</td>
<td>.36</td>
<td>-0.06</td>
<td></td>
</tr>
</tbody>
</table>

Note. $\bar{r}$ = semi-partial correlation. Frat = fraternity/sorority membership. Enhancement = enhancement motives. EnhanceXSS = interaction between enhancement motives and sensation seeking. For fraternity/sorority affiliation, positive values indicate that those who are less involved or not involved with a fraternity/sorority are scoring higher than those who are more involved. All individual values for variables are those from Step 3. $\Delta R^2$ for Step 3 = .00.
Chapter V

Discussion

The present study aimed to further examine the motivational model of alcohol use (Cox & Klinger, 1988) by assessing whether drinking motives and personality interact to predict heavy and problematic drinking among college students. Cox and Klinger (1988) theorized that drinking motives are the final common pathway to alcohol use, through which more distal influences exert their influence. However, studies that tested this theory by examining drinking motives as mediators of the relationships between personality factors and alcohol outcome variables have produced inconsistent findings. Since drinking motives do not consistently mediate these relationships as expected, it was hypothesized that drinking motives may act as moderators of the relationships between personality traits and alcohol use and alcohol-related problems. The present study examined eight separate interactions between personality traits and drinking motives in predicting alcohol use and alcohol-related problems.

Results of the present study did not support hypothesized interactions between personality traits and drinking motives. Instead, a parsimonious model of simple main effects was found between specific personality traits, drinking motives and alcohol outcomes. Personality traits and motives appear to play important, yet distinct roles in predicting alcohol use and alcohol-related problems among college students. Drinking motives appear to have particularly strong relationships with alcohol outcomes while personality variables demonstrated more modest relationships. Social, enhancement, and coping motives, and extraversion seem uniquely important to consider when seeking to identify, prevent and treat college students at risk for heavy drinking. Slightly different
results emerged for alcohol-related problems. It seems that enhancement, coping and conformity motives, and trait urgency are most important to consider when one is interested in identifying, preventing and treating students at risk for experiencing negative consequences associated with alcohol use.

The main effects of the present study are consistent with previous studies that have found positively reinforcing motives (i.e. enhancement and social) to be more strongly associated with alcohol use and negatively reinforcing motives (i.e. conformity and coping) to be more strongly associated with alcohol-related problems (e.g. Cooper, 1994; Carey & Correia, 1997; Neighbors et al., 2004). As in the case of the present study, other studies have also found that coping motives predict alcohol use and that enhancement motives predict alcohol-related problems (e.g. Hussong, 2003; Cooper et al., 1992). However, when drinking motives are considered together, several authors have found that only enhancement and coping motives predict alcohol outcomes (e.g. Martens et al., 2003; Cooper, 1992). So, the results of the present study are somewhat unique because they suggest that one should consider each of the four drinking motives when working with college students who may be at risk for heavy alcohol use and problematic drinking. Other studies have provided support for the ability of extraversion and urgency to predict alcohol outcomes (e.g. Cyders et al., 2009; Littlefield et al., 2009; Martsh & Miller, 1997; Miller et al., 2003; Read & O’Connor, 2006). It was a bit surprising that neuroticism and sensation-seeking were not significant predictors of alcohol use or negative consequences since several previous studies have demonstrated such relationships.
There are several potential reasons for why neuroticism and sensation seeking did not emerge as significant predictors of alcohol or alcohol-related problems. First, the use of different measures to assess personality traits, alcohol use and alcohol-related problems across studies may partially account for varying results as one cannot be sure that different measures of a construct are actually measuring that same construct. Different studies have varied in their findings of neuroticism as a predictor of the frequency and quantity of alcohol use. Some have identified neuroticism as a predictor of frequent but not heavy use (e.g. Hussong, 2003) while others found that neuroticism predicted both frequency and quantity of alcohol use (e.g. Ruiz et al., 2003). Combining measures of quantity and frequency into a composite variable to assess alcohol use in the present study prevented examination of the relationships between various independent measures of alcohol use and personality traits. It is possible, for example, that significant interaction effects exist for the average number of drinks per week, but not for binge drinking, and that this effect was not detected because the aforementioned aspects of alcohol use were combined into one variable rather than analyzed separately. It is noteworthy that at least two studies identified neuroticism as a protective factor for alcohol use (Kuntsche et al., 2008; Read & O’Connor, 2006) which suggests that findings of the relationship between that trait and alcohol outcomes is mixed and provides context for the finding of no significant relationships between neuroticism, alcohol use and alcohol-related problems in the present study. Studies of sensation seeking and alcohol outcomes have also produced mixed findings in terms of the trait’s association with quantity and frequency of alcohol consumption and alcohol-related problems (e.g. Cyders et al., 2009; Smith, 2008) again highlighting the limitation of not examining these
measures of use independently and context for the lack of statistically significant predictive relationships among these variables in the present study. Finally, neuroticism is a trait with at least six facets (Costa & McCrae, 1992) that may have differential relationships with alcohol outcomes. The present study did not examine personality traits at the facet level so it is unclear whether one or more facets of neuroticism may predict alcohol outcomes despite not finding a significant predictive relationship for the broader trait. There are several potential explanations for why the hypothesized interaction effects were not supported in the present study.

Theoretically, it seems that the relationships among the main study variables may in fact be one of mediation rather than moderation as has been theorized by Cox and Klinger (1988) and found empirically by several past studies. Mixed findings of mediation among personality traits, drinking motives and alcohol outcomes highlighted the need for further study of these relationships. Theories that highlight the importance of both personality and motives in predicting behavior and findings of interactions between personality traits and motivations for power and affiliation (Winter et al., 1998 and John et al., 1993, respectively) seemed to suggest that perhaps drinking motives and personality interact to predict alcohol consumption and the experience of problems related to alcohol use. The findings of the present study supported McAdams’ (1995) and McClelland’s (1951) claims that personality traits and motives are distinct constructs that differentially predict behavior. However, it appears that the two variables do not necessarily interact to predict behavior. The mixed findings and small effect sizes of studies that have investigated motives as a mediator of the relationship between personality traits and alcohol outcomes may be better accounted for by a third variable
that has yet to be included in the model rather than interaction effects between the independent variables. Perhaps the addition of situational variables such as mood or drinking environment would enhance the mediated model to produce more consistent results. Longitudinal studies that have failed to find evidence of mediation may highlight the role of situational variables in explaining relationships in the moment that change over time as the situational variables change.

Several methodological limitations of the study may have also contributed to the lack of interaction effects. First, the sample size of the present study reduced the power to detect interaction effects to 70% which may have been too low to detect small interaction effects, although this is unlikely given that the obtained levels of significance (i.e. $p = .32 - .99$) for such effects were far beyond that needed to reach statistical significance. A second statistical issue is the variability in the predictor and moderator variables. The predictor and moderator variables were normally distributed with relatively few extreme cases. While this is typically optimal for multiple regression, normally distributed predictor variables in observational studies lowers the power to detect interaction effects as most cases are piled up in the middle of the joint distribution of the predictor and moderator variables (Cohen, Cohen, West & Aiken, 2003). To address this problem, it is recommended that one oversample extreme cases, which was not done in the present study. A third explanation for the failure to find support the hypothesized interactions concerns multicollinearity. While centering the predictor variables before entering them into the regression equation minimizes the impact of multicollinearity, it is possible that the correlations among predictor and moderator variables (e.g. neuroticism and coping motives were significantly correlated at .29) posed problems in the current study.
Relationships Among Personality Traits, Drinking Motives, and Alcohol Use

Contrary to the hypotheses of the current study, drinking motives did not emerge as significant moderators of the relationships between personality traits and alcohol use. Drinking motives and personality traits appear to uniquely and independently predict alcohol use among college students. Social, coping and enhancement motives were stronger predictors of alcohol use than any of the personality variables included in the hypothesized relationships. There has been support for direct relationships between alcohol use and neuroticism (e.g. Hussong, 2003; Ruiz, Pincus & Dickinson, 2003), extraversion (e.g. Littlefield et al., 2009; Martsh & Miller, 1997; Read & O’Connor, 2006), urgency (e.g. Cyders et al., 2009; Miller et al., 2003), and sensation seeking (e.g. Cyders et al., 2007; Fischer & Smith, 2008; Smith et al., 2007). In the present study, only extraversion significantly predicted alcohol use accounting for approximately 3% of the variance in alcohol use after controlling for demographic variables. These findings suggest that individuals who are social and person-oriented, have a high need for stimulation, excitement and activity, and tend to experience positive emotions (Costa & McCrae, 1992) may consume more alcohol, more frequently than their peers who are less extraverted. Highly extraverted individuals may consume more alcohol than others in an attempt to enhance the positive affect they experience or fulfill their need for stimulation. These highly social individuals may also seek out and enjoy drinking parties more than less extraverted students.

All four drinking motives (i.e. social, enhancement, coping and conformity) have also been found to predict alcohol use in college student populations (e.g. Cooper, 1994; Carey & Correia, 1997; Martens et al., 2008). The findings of the present study are
consistent with previous research in that social, enhancement and coping motives all significantly predicted alcohol use. Enhancement motives accounted for the greatest proportion of variance in alcohol use (18% - 19%) followed by social motives (14%) and coping motives (4%). Conformity motives did not predict alcohol use. Similar to the present study, other authors have failed to demonstrate that conformity motives predict alcohol use (e.g. Magid et al., 2007; Neighbors et al., 2004). Several studies have found that negatively reinforcing motives are more strongly related to alcohol-related problems than alcohol use (e.g. Cooper, 1994; Martens et al., 2003; Magid et al., 2007), which was the case in this study. These findings suggest that individuals who drink to enhance their mood (enhancement motives), to obtain social rewards (social motives), and to avoid or reduce negative emotions (coping motives) may consume alcohol more frequently and in larger quantities than those who do not drink for the aforementioned reasons. Drinking to avoid social rejection (conformity motives) does not appear to be a risk factor for heavy or frequent alcohol use for participants in the present study.

Relationships Among Personality Traits, Drinking Motives, and Alcohol-Related Problems

In contrast to the hypotheses of the present study, drinking motives did not strengthen the relationship between personality traits and alcohol-related problems. Instead, drinking motives and personality traits were independent predictors of alcohol-related problems. Again, drinking motives tended to be stronger predictors of alcohol-related problems than personality traits. The exception to this was urgency, which was a relatively strong predictor accounting for approximately 14% of the variance in alcohol-related problems. It appears that it is important to consider the distinct roles that
personality traits and especially drinking motives play in predicting the experience of alcohol-related problems among college students who drink.

The finding that trait urgency significantly predicted alcohol-related problems is consistent with previous research among college students (e.g. Cyders et al., 2009; Magid & Colder, 2007; Smith et al., 2007). Although studies have found that neuroticism, extraversion and sensation seeking significantly predict alcohol-related problems (e.g. Hussong, 2003; Littlefield et al., 2009; Read & O’Connor, 2006) those relationships were not found in the current study. It appears that individuals who tend to experience strong impulses and act rashly, especially when experiencing negative affect, experience more negative consequences associated with their drinking than individuals lower in trait urgency. It may be that college students who self-report high trait urgency lack the coping skills necessary to delay acting on impulses in order to consider potential negative consequences of their behavior. When drinking, inhibitions are lowered, which may make it even more difficult for individuals high on trait urgency to choose not to act on impulses.

Consistent with previous research, the present study found that enhancement, coping and conformity motives significantly predicted alcohol-related problems (e.g. Cooper, 1994; Hussong, 2003; Martens et al., 2008). Coping motives accounted for the greatest proportion of variance in alcohol-related problems (18%) followed by enhancement motives (9% - 16%) and conformity motives (5%). The finding that social motives did not significantly predict alcohol-related problems is typical in research examining drinking motives among college students (e.g. Cooper, 1994; Magid et al., 2007; Neighbors et al., 2004). These findings suggest that individuals who drink to
enhance their mood (enhancement motives), to avoid or reduce negative emotions (coping motives), and to avoid social rejection (conformity motives) may experience more negative consequences as a result of their drinking than those who do drink for the aforementioned reasons. Drinking to obtain social rewards (social motives) does not appear to be a risk factor for alcohol-related problems in the present study.

**Implications**

The findings that personality traits and drinking motives appear to play independent roles in predicting drinking behavior and negative consequences associated with alcohol consumption may aid therapists in identifying college students most at risk for heavy alcohol use and alcohol-related problems. Results of the present study suggest different risk and protective factors for heavy and/or frequent alcohol use versus negative consequences associated with alcohol use. When considering who may be at heightened risk for heavy and frequent alcohol use, therapists should be alert for students who describe themselves as social and excitement seeking (i.e., high extraversion) and who report drinking to fit in with or have fun with friends (i.e., social motives), heighten their mood (i.e., enhancement motives), and manage negative emotions or distress (i.e., coping motives). Significant associations between demographic factors and alcohol use revealed that male students and those who belong to or are more closely affiliated with fraternities or sororities are also at increased risk for heavy alcohol use. In contrast, students who are more closely affiliated with religion or spirituality appear to be at less risk for heavy and frequent alcohol use. When considering who may be most at risk for experiencing negative consequences as a result of drinking, therapists may wish to identify those students who report experiencing strong impulses that they cannot help acting upon,
especially when experiencing distress (i.e., high trait urgency), as well as individuals who
drink to increase their positive emotions or well-being (i.e., enhancement motives), to
avoid being rejected by peers (i.e., conformity motives), and to handle negative emotions
(i.e., coping motives). In the present study gender did not appear to differentiate students
at increased risk for alcohol-related problems suggesting that male and female students
are at equal risk. Students who are members of or affiliated with fraternities or sororities
are at increased risk for experiencing problems related to their use. It is clear from the
aforementioned discussion of risk and protective factors for alcohol consumption and
associated negative consequences that the same factors that place one at risk for heavy
alcohol use do not necessarily place one at risk for alcohol-related problems and vice
versa. For example, individuals who drink to fit in with others (i.e. conformity motives)
do not necessarily drink more alcohol than students who do not drink for this reason, but
do appear to experience more problems related to their use, perhaps because they behave
in ways they typically would not in order to fit in that result in negative consequences
while drinking. It is imperative, therefore, that therapists assess and address the specific
risk factors for both alcohol use and alcohol-related problems. In addition to influencing
the assessment and identification of individuals at risk for heavy and problematic alcohol
consumption, findings may impact the design of prevention and treatment programs.

Based on the results of the present study it seems important that prevention and
intervention programs address personality traits and drinking motives to most effectively
help students reduce their alcohol consumption and minimize harmful consequences that
can result from drinking. Specifically, extraversion, urgency and all four drinking
motives emerged as predictors of alcohol outcomes. Several authors have recommended
the initiation of such targeted programs. In a review of the literature on college student drinking, Ham and Hope (2003) concluded that interventions addressing personality and cognitive processes (e.g. drinking motives) may best address the problem of heavy drinking in this population. Similarly, in their study of personality and alcohol use over a 16 year period, Littlefield and colleagues (2009) highlighted the importance of tailoring intervention programs to specific personality types to reduce problematic drinking.

Several researchers have developed and tested intervention programs targeted at specific personality traits, but not drinking motives, in adolescent and adult community populations. Conrad, Stewart, Pihl, and Dongier (2000), for instance, developed a brief coping skills intervention program targeted at adult females who self-reported abusing substances. Participants were randomly assigned to one of three 90 minute interventions: (a) a motivation-matched intervention involving personality-specific motivational and coping skills training, (b) a motivational control intervention involving a motivational film and a supportive discussion with a therapist, and (c) a motivation-mismatched intervention targeting a theoretically different personality profile. In this study, motivations were assessed by asking participants to identify the short-term reinforcing properties of their substance of choice. The components considered to produce change were (1) feedback on how participants’ scores on personality, psychopathology, and substance-related scales deviated relative to norms obtained for similarly aged, non-substance-abusing women, (2) discussion of the short-term and long-term reinforcing properties and consequences of substance use, (3) personality specific cognitive restructuring training, and (4) rehearsal of coping self-statements. Results showed that at a 6 month follow-up, only the matched intervention was more effective than the
motivational control intervention in reducing frequency and severity of problematic alcohol and drug use. Several other studies have found similar results in adolescent populations (e.g. Conrod, Castellanos, & Mackie, 2008; Conrad, Stewart, Comeau, & Maclean, 2006; O’Leary-Barrett, Mackie, Castellanos-Ryan, Al-Khudhairy, & Conrod, 2010). Namely, individuals who receive substance use treatments that are matched to their personality and provide them with (a) psychoeducation about the high-risk personality variable and the problematic coping behaviors associated with that personality style or trait (b) behavioral coping skills training, and (c) cognitive coping skills training, generally report reduced drinking quantity, binge drinking rates, and alcohol problems up to six months after intervention delivery. It is noteworthy that none of the interventions with published results has explicitly addressed individuals’ specific motivations for alcohol use even though including them has been recommended in the drinking motives literature (e.g. Kuntsche et al., 2010). The greater proportion of variance accounted for by drinking motives versus personality traits in the present further highlights the importance of tailoring prevention and intervention programs to target individuals’ specific reasons for drinking.

Prevention and treatment programs for college students should be tailored to provide personalized feedback to individuals about how their specific drinking motives put them at risk for heavy and problematic alcohol use and how they can make changes to moderate their drinking and minimize negative consequences. Focusing on how individuals can modify their motivations for drinking makes intuitive sense given that one’s reasons for drinking are theoretically more malleable than aspects of one’s personality. A potential intervention that addresses drinking motives could operate as
follows. Students who report drinking to manage anxiety or depression can be informed about how consuming alcohol for those reasons puts them at risk for experiencing problems when drinking or as a result of their alcohol use. They could be guided in establishing alternative ways to cope with their emotions rather than drinking. Such an intervention would incorporate personalized motivational enhancement strategies to encourage change and personalized cognitive-behavioral strategies that would allow participants to learn and practice new ways to manage motivations that put them at risk for heavy drinking and/or negative consequences associated with drinking. Research indicates that combining motivational enhancement and cognitive behavioral strategies is effective in reducing alcohol consumption and negative consequences among college students (Larimer and Cronce, 2002).

Selective interventions that target populations at increased risk for heavy alcohol use and alcohol-related problems generally yield higher effect sizes than universal programs that target a general population (Gottfredson & Wilson, 2003). Matching treatments to client characteristics has generally resulted in greater therapeutic impact relative to clients who are not appropriately matched to a treatment (Miller & Cooney, 1994). It may be that tailoring programs to individuals’ personality traits and drinking motives would increase the effectiveness and the currently small to moderate effect sizes ($d = .3-.4$; e.g., Neighbors et al., 2006; Walters et al., 2009) of existing alcohol prevention/intervention programs for college students.
Limitations

There are several limitations influencing the internal and external validity of this ex post facto survey-based study. First, the present methodology involved self-report instruments which allowed for the possibility that participants may have provided inaccurate or extreme responses. Participants were guaranteed anonymity and confidentiality which is expected to have minimized the likelihood of inaccurate responses. Additionally, prior research suggests that self-report measures of alcohol use are generally reliable (Babor, Steinberg, Anton, & del Boca, 2000; Miller et al., 2002). Additional limitations of the present methodology include common method variance and mono-method bias. Common method variance may inflate or deflate both Type I and Type II error rates because using only one method of measurement creates the potential for systematic error variance attributable to the method of measurement (self-report survey) to become entangled with true variance attributable to predictor variance. Mono-method bias (i.e. measuring each construct with only one instrument) threatens construct validity because one cannot be certain that the instrument is accurately measuring what it purports to measure. The use of commonly used measures with supported reliability and validity in the present study minimized the threat of mono-method bias.

An additional limitation is the possibility of self-selection of participants. That is, individuals who chose not to participate in the study may have differed in some consistent and important ways from those who chose to participate. For example, students who engage in heavy drinking or who have experienced severe negative consequences related to their drinking may have chosen not to participate for fear of being identified
and/or punished. An attempt to prevent self-selection was made by assuring participants of the anonymity and confidentiality of their responses.

Generalizability is another limitation of the present study. All participants were from a single university and were relatively homogeneous in their racial/ethnic composition. Race/ethnicity was examined as a potential covariate as previous studies have found significant differences in the quantity and frequency of alcohol use as well as the number and severity of drinking-related problems experienced by members of different racial and ethnic groups. No statistically significant racial/ethnic differences in outcome variables were found. Unfortunately the proportion of participants who identified as non-White was too small to examine differences in self-reported alcohol use, consequences, personality traits and drinking motives among various racial and ethnic groups. The homogeneous nature of the sample precludes generalizing the findings to diverse geographic and demographic samples of college students. In addition, it is possible that smaller effect sizes may have been obtained as a result of the limited sample since greater variability in variables is associated with stronger effect sizes. Finally, the cross-sectional nature of the data limits the degree to which causality can be inferred.

**Future Directions**

Results of the present study did not support drinking motives as a moderator of the relationship between personality traits and alcohol outcomes, but instead found that personality traits and drinking motives have direct, independent relationships with alcohol outcome variables. Considering the present findings together with evidence in the extant literature that suggests that drinking motives mediate relationships between
various personality traits and alcohol outcomes, it is clear that further research is necessary.

Researchers may wish to replicate and extend the current study with a larger, more diverse sample of college students by testing competing models of moderation and mediation. Longitudinal studies investigating personality, drinking motives and alcohol use and problems is limited. Larger scale prospective studies would further elucidate the roles that personality traits and motives play in predicting alcohol outcomes by providing insight into how these variables vary in relation to one another over time. A model of moderated mediation may provide a better fit to the data than the model of moderation tested in the present study. For instance, perhaps sensation seeking predicts alcohol use by way of its association with enhancement motives (i.e. mediation) but only for individuals who report high enhancement motives, versus low enhancement motives.

The present study examined only several combinations of personality traits and drinking motives in predicting alcohol use and alcohol-related problems. It may be that interaction effects exist among other sets of variables not hypothesized to interact in the present study such as extraversion and enhancement motives, or urgency and coping motives. Perhaps more important to examine would be the impact of situational factors on the relationship between personality and drinking motives and alcohol outcomes. The field would benefit from examination of the ways in which factors such as mood or the setting in which alcohol is consumed impact the independent relationships between drinking motives and alcohol outcomes as well as personality traits and alcohol outcomes. Perhaps situational factors moderate the direct relationships between the aforementioned variables and alcohol use and problems. Further investigation of racial
and ethnic difference in levels of personality traits and drinking motives is certainly warranted as differences in such variables among various groups have clinical implications. Specifically, it would be helpful for clinicians to know if students of a particular race or ethnicity are more likely to drink to cope and therefore at greater risk for experiencing alcohol-related problems. Although the effects of fraternity/sorority status, religious/spiritual affiliation and gender were controlled for in the present study, future research may wish to assess whether these variables should be included in prevention/intervention programs for college students. Religious/spiritual affiliation has the potential to bolster students’ resilience to heavy and problematic alcohol use and for this reason may be important to assess and strengthen in prevention programs. Gender and fraternity/sorority status are risk factors that perhaps should be attended to as risk factors in intervention programs.

Finally, the finding that personality traits and drinking motives play uniquely important roles in predicting heavy drinking and alcohol-related problems and that drinking motives appear to have stronger relationships with alcohol outcomes than personality traits suggests that drinking motives should be included in personalized prevention/intervention programs for college students. Research on interventions targeted at both personality and motives among college students is currently lacking despite calls from experts in the field (e.g. Ham & Hope, 2003; Kuntshe et al., 2010) to include motives in such programs. Investigators may consider designing a program in which students who present at a counseling center or university health services appointment or who are referred for committing an alcohol infraction on campus, are screened for heavy drinking and alcohol-related problems and invited to participate. Participants’ personality
traits and drinking motives could then be assessed to determine which factors increase their risk for heavy alcohol use and negative consequences. A brief intervention tailored to individuals’ specific personality traits with a greater emphasis on addressing their drinking motives would be then delivered. Components may include, among other things, psychoeducation about how individuals’ personality traits and drinking motives may place them at risk and how to manage personality traits and motives to reduce drinking. For instance, a student who reported high trait urgency and coping motives may be taught how to manage impulses to act brashly when experiencing negative emotion and helped to create alternative ways to cope with negative emotions. Incorporating elements of interventions that have already demonstrated effectiveness (i.e. motivational enhancement, norms clarification, and cognitive behavioral strategies, Larimer & Cronce, 2002) and comparing these personality- and motives-targeted programs to attention-only controls as well as established programs currently used with college students, such as the Brief Alcohol Screening and Intervention for College Students (Dimeff et al., 1999), would be a fruitful area of future research.
References


doi:10.1097/01.ALC.0000171940.95813.A5


doi:10.1016/S0272-7358(99)00026-4


doi:10.1016/j.paid.2003.11.007


Appendix A

How I am in general

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disagree Strongly</td>
<td>Disagree a little</td>
<td>Neither agree nor disagree</td>
<td>Agree a little</td>
<td>Agree strongly</td>
</tr>
</tbody>
</table>

I am someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas
6. _____ Is reserved
7. _____ Is helpful and unselfish with others
8. _____ Can be somewhat careless
9. _____ Is relaxed, handles stress well.
10. _____ Is curious about many different things
11. _____ Is full of energy
12. _____ Starts quarrels with others
13. _____ Is a reliable worker
14. _____ Can be tense
15. _____ Is ingenious, a deep thinker
16. _____ Generates a lot of enthusiasm
17. _____ Has a forgiving nature
18. _____ Tends to be disorganized
19. _____ Worries a lot
20. _____ Has an active imagination
21. _____ Tends to be quiet
22. _____ Is generally trusting
23. _____ Tends to be lazy
24. _____ Is emotionally stable, not easily upset
25. _____ Is inventive
26. _____ Has an assertive personality
27. _____ Can be cold and aloof
28._____ Perseveres until the task is finished

29._____ Can be moody

30._____ Values artistic, aesthetic experiences

31._____ Is sometimes shy, inhibited

32._____ Is considerate and kind to almost everyone

33._____ Does things efficiently

34._____ Remains calm in tense situations

35._____ Prefers work that is routine

36._____ Is outgoing, sociable

37._____ Is sometimes rude to others

38._____ Makes plans and follows through with them

39._____ Gets nervous easily

40._____ Likes to reflect, play with ideas

41._____ Has few artistic interests

42._____ Likes to cooperate with others

43._____ Is easily distracted

44._____ Is sophisticated in art, music, or literature
**Appendix B**

**UPPS**

Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement. If you **Agree Strongly** circle 1, if you **Agree Somewhat** circle 2, if you **Disagree somewhat** circle 3, and if you **Disagree Strongly** circle 4. Be sure to indicate your agreement or disagreement for every statement below. Also, there are a few more questions on the next page.

<table>
<thead>
<tr>
<th>1. I have a reserved and cautious attitude toward life.</th>
<th>Agree Strongly</th>
<th>Agree Some</th>
<th>Disagree Some</th>
<th>Disagree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. I have trouble controlling my impulses.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I generally seek new and exciting experiences and sensations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I generally like to see things through to the end.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. My thinking is usually careful and purposeful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I have trouble resisting my cravings (for food, cigarettes, etc.).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I'll try anything once.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. I tend to give up easily.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I am not one of those people who blurt out things without thinking.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I often get involved in things I later wish I could get out of.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. I like sports and games in which you have to choose your next move very quickly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. Unfinished tasks really bother me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. I like to stop and think things over before I do them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. When I feel bad, I will often do things I later regret in order to make myself feel better now.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>15.</td>
<td>I would enjoy water skiing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16.</td>
<td>Once I get going on something I hate to stop.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17.</td>
<td>I don't like to start a project until I know exactly how to proceed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18.</td>
<td>Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19.</td>
<td>I quite enjoy taking risks.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20.</td>
<td>I concentrate easily.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21.</td>
<td>I would enjoy parachute jumping.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22.</td>
<td>I finish what I start.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23.</td>
<td>I tend to value and follow a rational, &quot;sensible&quot; approach to things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24.</td>
<td>When I am upset I often act without thinking.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25.</td>
<td>I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>26.</td>
<td>I am able to pace myself so as to get things done on time.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>27.</td>
<td>I usually make up my mind through careful reasoning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>28.</td>
<td>When I feel rejected, I will often say things that I later regret.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>29.</td>
<td>I would like to learn to fly an airplane.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>30.</td>
<td>I am a person who always gets the job done.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>31.</td>
<td>I am a cautious person.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>32.</td>
<td>It is hard for me to resist acting on my feelings.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>33.</td>
<td>I sometimes like doing things that are a bit frightening.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
34. I almost always finish projects that I start.  
35. Before I get into a new situation I like to find out what to expect from it.  
36. I often make matters worse because I act without thinking when I am upset.  
37. I would enjoy the sensation of skiing very fast down a high mountain slope.  
38. Sometimes there are so many little things to be done that I just ignore them all.  
39. I usually think carefully before doing anything.  
40. Before making up my mind, I consider all the advantages and disadvantages.  
41. In the heat of an argument, I will often say things that I later regret.  
42. I would like to go scuba diving.  
43. I always keep my feelings under control.  
44. I would enjoy fast driving.  
45. Sometimes I do impulsive things that I later regret.
Appendix C

Drinking Motives Measure

**Instructions:** Thinking of all the times you drink, how often would you say that you drink for each of the following reasons?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Almost never/Never</th>
<th>Some of the time</th>
<th>Half of the time</th>
<th>Most of the time</th>
<th>Almost always/Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To forget your worries</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Because your friends pressure you to drink</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Because it helps you enjoy a party</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Because it helps you when you feel depressed or nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. To be sociable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. To cheer up when you are in a bad mood</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Because you like the feeling</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. So that others won’t kid you about <em>not</em> drinking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Because it’s exciting</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. To get high</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Because it makes social gatherings more fun</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. To fit in with a group you like</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. Because it gives you a pleasant feeling</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Because it improves parties and celebrations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Because you feel more self-confident and sure of yourself</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. To celebrate a special occasion with friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. To forget about your problems</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. Because it’s fun</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. To be liked</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. So you won’t feel left out</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix D

Daily Drinking Questionnaire

**Directions:** Please indicate the number of drinks that you typically consumed on each day of the week over the past 30 days, and how many total hours you spent consuming alcohol. A drink is considered a 12oz beer (i.e., most bottled or canned beer), a 5oz glass of wine (i.e., a regular-sized glass of wine), or a 1.25oz (one shot) drink of hard alcohol.

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Drinks:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the past 30 days, what is the most number of drinks you have had on any one occasion? __________

On that occasion, over how many hours did you consume alcohol?________

In the past 2 weeks, how many times have you had 5 or more drinks at one sitting (if you are a male), or 4 or more drinks in one sitting (if you are a female)? __________
Appendix E

Brief Young Adult Alcohol Consequences Questionnaire

Below is a list of things that sometimes happen to people either during or after they have been drinking alcohol. Next to each item below, please mark an “X” in either the NO or the YES column to indicate whether that item describes something that has happened to you **IN THE PAST 30 DAYS**.

<table>
<thead>
<tr>
<th>In the 30 days…</th>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have had a hangover (headache, sick stomach) the morning after I had been drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I have taken foolish risks when I have been drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I’ve not been able to remember large stretches of time while drinking heavily.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The quality of my work or school work has suffered because of my drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I have had less energy or felt tired because of my drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. My drinking has gotten me into sexual situations I later regretted.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I often have ended up drinking on nights when I had planned not to drink.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. My physical appearance has been harmed by my drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. While drinking, I have said or done embarrassing things.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I have felt very sick to my stomach or thrown up after drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I have not gone to work or missed classes at school because of drinking, a hangover, or illness caused by drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. When drinking, I have done impulsive things I regretted later.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I have been overweight because of drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I have woken up in an unexpected place after heavy drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I have spent too much time drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I have felt badly about myself because of my drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. I have felt like I needed a drink after I’d gotten up (that is, before</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
breakfast).

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19.</td>
<td>I have driven a car when I knew I had too much to drink to drive safely.</td>
</tr>
<tr>
<td>20.</td>
<td>I have neglected my obligations to family, work, or school because of drinking.</td>
</tr>
<tr>
<td>21.</td>
<td>I have often found it difficult to limit how much I drink.</td>
</tr>
<tr>
<td>22.</td>
<td>I have passed out from drinking.</td>
</tr>
<tr>
<td>23.</td>
<td>I have become very rude, obnoxious, or insulting after drinking.</td>
</tr>
<tr>
<td>24.</td>
<td>I have found that I needed larger amounts of alcohol to feel any effect, or that I could no longer get high or drunk on the amount that used to get me high or drunk.</td>
</tr>
</tbody>
</table>
Appendix F

Demographics Questionnaire

Directions: Please provide the following information.

1. Sex:
   _____ Male
   _____ Female

2. Age: _________

3. Year in school:
   _____ Freshman
   _____ Sophomore
   _____ Junior
   _____ Senior

4. At what age did you consume your first alcoholic beverage? ________

5. Please indicate where you live when school is in session:
   _____ On-campus dormitory
   _____ On-campus apartment
   _____ Off-campus dormitory or other campus-owned facility
   _____ Off-campus apartment
   _____ At home with parents
   _____ Other (Please Specify): ________________________________

6. Approximately how tall are you (in inches)? [5 feet = 60 inches, 6 feet = 72 inches]
   __________________

7. What is your best estimate of your current weight in pounds? ________________

8. Please indicate your racial group: ________________________________
_____Asian/Asian American

_____Black/African American

_____Caucasian

_____Hispanic/Latino(a)

_____Native American

_____Biracial/Multiracial

Other (Please Specify): _________________________

9. Please indicate (if applicable) your specific ethnic group or tribal membership (e.g.,
Korean, Jamaican, Puerto Rican, Iroquois, etc.): __________________________

10. Which do you consider to be most appropriate in describing your generational status:

_____1st Generation = I was born in a country other than U.S. and came to the U.S. as an adult

_____1.5 Generation = I was born in a country other than U.S. and came to the U.S. as a child or adolescent

_____2nd Generation = I was born in the U.S., either parent was born in a country other than U.S.

_____3rd Generation = I was born in the U.S., both parents were born in U.S., and all grandparents were born in a country other than U.S.

_____4th Generation = I was born in the U.S., both parents were born in U.S., and at least one grandparent born in a country other than U.S. and one grandparent born in U.S.

_____5th Generation = I was born in the U.S., both parents and all grandparents also born in U.S.
Don’t know what generation best fits since I lack some information.

Other (Please specify): ___________________________________

11. How many years have you lived in the United States? _______________

12. Please estimate your parents' combined annual income:

   _____ Approximately $25,000.00 per year or less
   _____ Approximately $50,000.00 per year
   _____ Approximately $75,000.00 per year
   _____ Approximately $100,000.00 per year
   _____ Approximately $150,000.00 per year or more

13. Have you ever in your life considered yourself to be spiritual/religious?

   _____ Yes
   _____ No

14. How spiritual/religious do you currently consider yourself to be? Please choose one response:

   _____ Not at all spiritual/religious
   _____ Somewhat spiritual/religious
   _____ Quite spiritual/religious
   _____ Very spiritual/religious

15. Please indicate the degree to which you are currently affiliated with a fraternity or a sorority, using the scale below:

   _____ An active member or pledge who lives with other members
   _____ An active member or pledge who lives with mostly or all non-members
   _____ A non-member who frequently associates with members (e.g., regularly attends
fraternity parties)

_____ A non-member who occasionally associates with members

_____ Not at all affiliated

16. How would you define your typical level of athletic involvement in the past 12 months? Please select one response:

_____ Elite athlete (national or international level)

_____ Varsity athlete

_____ Recreational athlete (e.g., club sports, intramurals or other organized teams)

_____ Recreational athlete (Informal competition, e.g. pickup hoops)

_____ Exercise regularly

_____ Exercise occasionally

_____ I do not exercise