Coping and Enhancement Motives in Female College Drinkers:

Patterns of Alcohol Use, Problems, and Risky Behavior

A Thesis

Submitted to the Miami University Honors Program

in partial fulfillment of the requirement for

University Honors with Distinction

By

Emily A. Philips-Roth

Miami University

Oxford, Ohio

2011
Abstract

This 10-week prospective study was conducted to further the understanding of the relationship between coping and enhancement drinking motives and patterns of alcohol consumption, negative consequences/problems, and risky behavior in college women. Participants were 424 college women from a midsized Midwestern university, who completed weekly surveys about their alcohol use, problems associated with alcohol use, general risky behaviors, risky sexual behaviors, and alcohol-facilitated sexual assault. Participants were divided into four groups based upon high internal drinking motives (high-combined, high-coping, high-enhancement, and non-internally motivated). The high-combined and high-enhancement groups generally had the highest alcohol consumption and drug use, and risky sexual practices with strangers. The high-coping group had the most alcohol-related problems after accounting for alcohol use, risky sex with a regular partner, and was at the greatest risk for alcohol-facilitated sexual assault both retrospectively and prospectively. Implications for future research and intervention are discussed.

Keywords: college women, drinking motives, alcohol-related problems, risky sex
Coping and Enhancement Motives in Female College Drinkers:

Patterns of Alcohol Use, Problems, and Risky Behavior

By Emily A. Philips-Roth

Approved by:

Dr. Terri Messman-Moore, Ph.D.

Dr. Aaron Luebbe, Ph.D.

Ms. Angela Volz, M.A.

Accepted by:

Dr. Alyssa Tyger, Director

University Honors Program
Acknowledgments

I want to thank my wonderful advisor, Dr. Terri Messman-Moore for her patience and guidance throughout this entire process. I am a better researcher and student because of her hard work and instruction, and I feel completely prepared to complete projects of a similar nature in graduate school. I also want to thank my two other readers, Dr. Aaron Luebbe and Ms. Angela Volz for the time and effort they put into reading my thesis. I also want to thank my parents for all of their support during my four years at Miami, especially when I wanted to let “senioritis” take over. Finally, I want to thank all of my amazing friends who put up with me during the stressful and exciting time of writing a thesis.
Table of Contents

Introduction.................................................................................................9
Methods..........................................................................................................15
Results...........................................................................................................19
Discussion.......................................................................................................28
References.......................................................................................................35
Tables...............................................................................................................42
List of Tables

Table 1-Differences in Alcohol Consumption at Time 1 by Motivation Group..........................42
Table 2-Differences in Alcohol Related Problems at Time 1 by Motivation Group Controlling for Alcohol Use.........................................................................................................................43
Table 3-Differences in Risky Sex at Time 1 by Motivation Group Controlling for Alcohol Use.........................................................................................................................44
Table 4-Frequency of General Negative Consequences During 9 Week Study..........................45
Table 5-Prevalence of General Risky Behavior During 9 Week Study........................................46
Table 6-Prevalence of Risky Sexual Behavior During 9 Week Study.........................................47
Table 7-Alcohol Related Sexual Assault.....................................................................................49
Coping and Enhancement Motives in Female College Drinkers:

Patterns of Alcohol Use, Problems, and Risky Behavior

Rates of heavy episodic drinking among young women are on the rise. In a review of drinking behaviors among young people aged 12-34 between 1979 and 2006, Grucza, Norberg, and Beirut (2009) found startling results. For women aged 18-20, prevalence of heavy episodic drinking (4 or more drinks in one setting) increased from 22.1% in 1979 to 30.1% in 2006, while the prevalence of heavy episodic drinking (5 or more drinks in one setting) for their male counterparts aged 18-20 actually decreased from 47.1% to 41.0%. Results for women aged 21-23 were even more drastic, with the prevalence of heavy episodic drinking increasing from 20.3% in 1979 to 38.6% in 2006, a percent increase of nearly 100%. While men in this age group also saw an increase it was much less pronounced, moving from 50.3% in 1979 to 58.5% in 2006, a percent increase of only 15%. Thus while both genders are experiencing overall increases in heavy episodic drinking, the trajectory appears to be much steeper among women.

This dramatic increase in heavy episodic drinking for women is of particular concern because of the increased risks of health problems and negative consequences that women face both in general and compared to men. In an international sample of men and women from seven European countries, Kuntsche, Plant, Plant, Miller, and Gmel (2008) found that women reported more immediate health consequences when drinking more often, as compared to men. In addition to short-term health consequences like hangovers, nausea, and vomiting, women can suffer from more serious long-term consequences like menstrual disorders, infertility, heart disease, and stroke (CASA, 2007). Women also develop alcoholic cirrhosis and alcoholic hepatitis at younger ages and at lower accumulated alcohol intakes than men (Thomasson, 1995). Women with mental health issues like eating disorders, anxiety disorders, or depression are
especially likely to abuse alcohol, though it is unclear whether alcohol abuse precedes or follows the onset of these disorders (CASA, 2007). Women’s alcohol use is also associated with numerous negative sexual outcomes, including sexually transmitted diseases (Cook & Clark, 2005; Cooper, 2002; Hutton, McCaul, Santora, & Erbelding, 2008), unintended pregnancies (Naimi, Lipscomb, Brewer, & Gilbert, 2003; Ingersoll, et al., 2005), and unwanted sexual experiences. Parks and Fals-Stewart (2004) found that on days that women consume alcohol, they are three times more likely to experience sexual aggression than on days when they do not drink, and as consumption increases, the risk of sexual aggression becomes nine times more likely. In a sample of college students, Mohler-Kuo, Dowdall, Koss, & Wechsler (2004) found that 72% of victimized women were raped while intoxicated. Given the seriousness of these consequences, efforts must be made to better understand the underlying reasons for women’s risky drinking behavior.

One factor that partially explains individual patterns in alcohol consumption is drinking motives. According to Cooper (1994), understanding drinking motives “should provide insight into the circumstances in which an individual is likely to drink, how much he or she is likely to drink, what the probable consequences are, and how to best intervene should therapeutic intervention be warranted” (p. 117). Essentially, drinking motives are proximal to and predictive of drinking behaviors. Cooper (1994) proposed a model of drinking motives, which consists of four domains of reasons why a person drinks: coping (e.g. “to forget your worries”) enhancement (e.g. “because it’s fun”), social (e.g. “to be sociable”), and conformity (e.g. “to fit in with a group you like”). This model has shown excellent validity and reliability across age groups, ethnicity, and gender (Cooper, 1994; Cooper, et al., 1995), hence numerous studies have focused on these four drinking motives to better understand drinking behavior (see Kuntsche, Knibbe, Gmel, &
Engels, 2005 for a review). Although the four motives identified by Cooper are commonly studied, two motives in particular—enhancement and coping motives—are associated with increased use and problematic outcomes, and have been a particular focus of researchers (Kuntsche, et al., 2005; Merrill & Read, 2010).

**Coping Motives**

Drinking to cope is conceptualized as a reactive process of drinking in the context of, or to decrease negative emotions, and thus is categorized as internally motivated, suggesting a deficit in more adaptive coping strategies. Coping drinking motives are associated with problematic drinking behaviors, such as drinking alone, and because the desire to squelch negative emotions is highly motivating, individuals who drink to cope may become psychologically dependent on alcohol to deal with less serious everyday negative emotions (Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995; Cooper, Russell, Skinner, & Windle, 1992). It is important to note that although enhancement and social drinking motives are both associated with high levels of alcohol consumption, coping drinking motives are associated with more problematic alcohol-related outcomes (Kuntsche, et al., 2005). Among college women with a history of child abuse, coping motives significantly predicted negative alcohol related consequences above and beyond enhancement motives (Goldstein, Flett, & Wekerle, 2010). Coping motives are quite salient in understanding problematic drinking among college students, especially college women (Park & Levenson, 2002).

Coping motives have been consistently associated with alcohol-related problems and alcohol misuse. Coping motives accounted for 22% of the variance in RAPI scores in a sample of college students (Martens, Rocha, Martin, & Serrao, 2008), and in a sample of emerging adults, predicted alcohol-related dysfunction in social and occupational domains above and
beyond other drinking motives and after controlling for alcohol use (Kong & Bergman, 2010). In another college sample, Lyvers, Hasking, Hani, Rhodes, and Trew (2010) found that coping motives significantly predicted alcohol dependence and alcohol-related problems (as measured by the AUDIT). People who report drinking to cope also report more positive alcohol expectancies (Park & Levenson, 2002), suggesting that they believe that alcohol can reduce their distress. Coping motives are often aimed at reducing anxiety, such as social anxiety, which Lewis et al. (2008) found to be associated with greater risk of negative consequences in drinking situations. Additionally, coping drinkers who are high in urgency (the tendency to act rashly in negative emotional states) are at increased risk for drinking/drunkenness and alcohol problems (Cyders & Coskunpinar, 2010). Martens, et al. (2008) also found coping motives to be significantly correlated with alcohol consumption and negative consequences; this relationship was strengthened by the presence of high negative affect.

**Enhancement Motives**

Enhancement motives, like coping motives, are internally motivated but in a different way. Enhancement-motivated drinkers tend to be sensation seekers who purposefully use alcohol to enhance positive affect states or emotional experiences (Cooper, 1994). Because enhancement motives are associated with the pursuit of positive states, such motives are associated with negative alcohol-related consequences only through direct alcohol use (Cooper, 1994, Cooper, et al., 1995). In other words, enhancement-motivated drinkers are at risk for problems due to the large quantity of alcohol they consume rather than the context in which they consume it. Individuals who drink for enhancement reasons have positive alcohol expectancies and are drawn to the euphoric qualities of alcohol, though it is not clear if positive emotion functions in the same way for enhancement-motivated drinkers as negative emotion does for
coping-motivated drinkers (Cooper, et al., 1995; Kong & Bergman, 2010). Kuntsche, von Fischer, and Gmel (2008) found a positive correlation between extraversion and enhancement motives, which is consistent with the idea that extraverted individuals seek arousal stimuli, and hence would be more likely to drink for enhancement reasons. Sensation-seeking adolescents also tend to underestimate the negative consequences of alcohol use (Urbán, Kökönyei, & Demetrovics, 2008).

Quantity of alcohol consumption is an important outcome related to enhancement motives. In an undergraduate sample, enhancement motives are positively associated increased consumption, including the practice of “pre-gaming” (drinking before going out to a social event or bars) (Read, Merrill, & Bytschkow, 2010). The significance of enhancement motives in predicting consumption was also replicated in a sample of Swiss college students (Kuntsche & Cooper, 2010). In a laboratory experimental setting using positive musical mood induction procedures, Birch et al. (2008) found that enhancement-motivated drinkers showed activation of implicit attention to alcohol cues and reward-alcohol implicit associations, suggesting that positive mood triggers implicit alcohol cognition in enhancement motivated drinkers.

Enhancement motivated drinkers often face alcohol-related problems similar to those seen among coping-motivated drinkers, but apparently for different reasons. Unlike the coping motivated drinkers, Cyders and Coskunpinar (2010) found that enhancement motivated drinkers tended to be at high risk for drunkenness and alcohol problems independent of being high in urgency. Also unlike coping motives, enhancement motives were positively correlated with all three subscales of the AUDIT, meaning enhancement motives were also correlated with consumption rather than just alcohol dependence and alcohol-related problems (Lyvers, et al., 2010).
In a study of particular interest, given its focus on both enhancement and coping motives, Goldstein and Flett (2009) examined the relationship between drinking motives in a co-ed sample of first-year college students, to see how personality factors and alcohol use varied between groups. They found that coping motivated drinkers had higher rates of heavy episodic drinking, placing them at greater risk for alcohol-related problems, and that coping-enhancement drinkers had similar drinking patterns and faced similar problems. Enhancement and non-internally motivated drinkers did not differ significantly from one another on quantity of alcohol consumed.

Goldstein and Flett’s (2009) study was a great step forward in understanding the correlates of these two internal drinking motives. However, questions remain. For instance, Goldstein and Flett’s sample included only first-year college students, whose drinking patterns may not yet be well established or stable (Del Boca, Darkes, Greenbaum, & Goldman, 2004; Maggs, Williams, & Lee, 2011). Moreover, both men and women were included, although gender differences were not fully explored. Thus it is unknown whether their findings apply to women specifically, which is questionable, given that women tend to endorse coping motives less frequently than do men (Kuntsche, et al., 2005; LaBrie, Lac, Kenney, & Mirza, 2011). Furthermore, the focus of their investigation was on alcohol-related problems and emotion-related variables, thus the impact of drinking motives on a broader range of alcohol-related risk-taking and negative consequences, such as sexual assault, were not assessed. Finally, given the retrospective design utilized by Goldstein and Flett, it is not clear whether drinking motives temporally preceded drinking patterns or actually predicted alcohol-related problems. Thus enhancement and coping motives appear to merit further exploration, particularly with prospective designs.
Study Purpose

The current study seeks to better understand the patterns of alcohol consumption, risky behaviors, and negative consequences associated with coping and enhancement motives, particularly for college women. Using a four-group design similar to that of Goldstein and Flett (2009), the present study sought to understand how coping and enhancement motives are related to alcohol consumption, alcohol-related problems (e.g., blackouts, injuries), risky behavior (e.g., drunk driving, drug use), risky sexual behavior, and frequency of sexual assault over a 10-week period. An important issue in this research however, is that high levels of alcohol use explain the link between enhancement motives and negative alcohol-related outcomes (Cooper, 1994; Cooper, et al. 1995; Kuntsche, et al., 2005; Kuntsche, et al., 2006), whereas coping motives tend to be associated with negative outcomes regardless of level of alcohol use (Kuntsche et al., 2005). Thus, based upon this information, and upon recommendations by previous researchers (e.g., Cooper, 1994, Kuntsche, et al., 2005), the current study will control for levels of alcohol use when examining negative alcohol-related consequences and related risky behavior.

We hypothesize that all of the internally motivated groups (high combined, high coping, and high enhancement) will report higher alcohol consumption, more alcohol-related problems, higher frequency of risky behaviors, and greater likelihood of sexual assault than the non-internally motivated group. Furthermore, we hypothesize that group differences will emerge, with coping-motivated drinkers having greater alcohol-related problems, and with enhancement-motivated drinkers experiencing more consumption-related negative consequences such as blackouts and injuries to self or others.

Method

Participants
Initially, 424 college women from a mid-sized public university in the Midwest were recruited for the present study. After selecting for women who had consumed alcohol in the past 30 days, 82.8% (n = 351) of the original sample remained. The mean age of participants was 19.9 years (SD = 1.12 years) with a range from 18 to 23 years. The sample was fairly evenly divided between the four education levels (First year n = 65, 18.8%; Sophomore n = 77, 22.3%; Junior n = 85, 24.6%; Senior n = 118, 34.2%). The sample was primarily Caucasian (n = 312, 89.7%), almost entirely unmarried (n = 340, 98.3%), and 28.8% (n = 100) were members of a sorority. Participants came from an educated background, with 74.6% (n = 306) indicating their father had at least a Bachelor’s Degree and 69.0% (n = 283) indicating their mother had at least a Bachelor’s degree. The sample was predominately upper-middle class with 59.6% (n = 203) indicating an annual family income of greater than $75,000.

Measures

Coping and enhancement drinking motives. The Coping and Enhancement subscales of the Drinking Motives The Questionnaire—Revised (DMQ-R, Cooper, 1994) were used to assess drinking to cope (e.g., “To forget your worries”) and drinking for enhancement purposes (e.g. “Because it gives you a pleasant feeling”). Participants indicated how often they drank due to coping and enhancement motives using a five-point Likert scale (1 = “Almost never/never” to 5 = “Almost always/always”). Subscale scores are computed as a mean of the relative frequency ratings for each of the five items on each subscale. The mean score for the coping subscale was 2.21 (SD = 0.90); the mean score for the enhancement subscale was 3.21 (SD = 0.95). Both subscales demonstrated good internal consistency (coping Cronbach’s α = .86; enhancement Cronbach’s α = .90).

Alcohol use. Participants were asked if they had ever consumed alcohol and their
highest number of drinks in one drinking occasion in the past 30 days at Time 1, and the number of drinks consumed each day (reported weekly) for each of the nine prospective weeks.

**Alcohol related problems.** Alcohol-related problems were assessed at Time 1 and Time 10 using the 23-item *Rutgers Alcohol Problem Index* (RAPI, White & Labouvie, 1989). Participants indicated how many times in the past three years (Time 1) and in the past 9 weeks (Time 10) certain behaviors occurred due to their alcohol consumption (e.g., “Not able to do your homework or study for a test”). Using a five-point Likert scale from 0 = “Never” to 4 = “More than 10 times,” the scale is scored by summing the 23 items resulting in total scores which range from 0 to 69. Higher levels indicate more problematic drinking tendencies. The mean score for Time 1 was 12.63 ($SD = 11.56$), and for Time 10 the mean score was 5.51 ($SD = 6.59$). Internal consistency for the RAPI was good (Time 1 Cronbach’s $\alpha = .90$; Time 10 Cronbach’s $\alpha = .86$).

The *Alcohol Use Disorders Test* (AUDIT, Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Saunders, Aasland, Babor, De La Fuente, & Grant, 1993) was also used to assess alcohol-related problems at Time 1. The AUDIT is a 10-item self-report survey that assesses hazardous alcohol use (e.g., heavy episodic drinking), alcohol dependence symptoms, and harmful alcohol use (e.g., blackouts, alcohol-related injuries). A score of 7 or greater suggests the possibility of hazardous drinking among women. Developed by the World Health Organization, the AUDIT is consistent with ICD-10 diagnosis of alcohol dependence. The AUDIT possesses strong concurrent validity with the MAST ($r = .88$) and the CAGE ($r = .78$), as well as strong internal consistency reliability and good test-retest reliability. The mean score for this sample was 8.25 ($SD = 5.64$), and internal consistency was good (Cronbach’s $\alpha = .84$).

Two items from the AUDIT were administered on a weekly basis to assess the specific
alcohol-related problems of blackouts and injuries to self or others. Participants indicated how often they experienced blackouts and drinking related injuries to themselves or other people retrospectively for the past six months at Time 1 and for the past week for Times 2-10. For the purpose of the study, responses for Times 2-10 were collapsed into 3 categories: zero, once, and more than once.

**Risky Behavior.** Items from the Cognitive Appraisal of Risky Events-Revised (CARE-R, Katz, Fromme, & D’Amico, 2000), a 28-item revised version of the Cognitive Appraisal of Risky Events questionnaire (CARE, Fromme, Katz, & Rivet, 1997), were used to assess the risky behaviors of marijuana use, mixing drugs and alcohol, drinking and driving, sex with a stranger, sex with a “regular partner” (defined by the participant as a monogamous partner) under the influence of alcohol/drugs, and sex with a stranger under the influence of alcohol/drugs. Participants indicated how often they engaged in these behaviors retrospectively for the past six months at Time 1 and for the past week for Times 2-10. For the purpose of the study, responses from Times 2-10 were collapsed into 3 categories: zero, once, and more than once.

**Sexual Assault.** Adult alcohol-facilitated sexual assault was assessed as a yes/no variable, using a modified version (Koss, et al., 2007) of the Sexual Experiences Survey (SES) originally developed by Koss and Oros (1982). For the current study, only items pertaining to unwanted sexual behaviors while incapacitated were assessed, such as fondling of sex organs, oral sex, and intercourse. At Time 1, participants indicated how often (0, 1, 2, or 3+ times) unwanted sexual activities happened to them during a time period beginning when they turned 14-years-old and including the year prior to the start of the study. For Times 2-10, participants indicated how often (0, 1, 2, or 3+ times) a series of unwanted sexual activities happened to them during the past week. Responses were collapsed into two categories indicating the presence or
absence of alcohol-facilitated sexual assault.

Procedure

Participants were recruited through advertisements in the student newspaper or posted on campus. The advertisements sought college women 18 and older to participate in a study of the life experiences of college women. Participants were offered the opportunity to earn up to $75 for completing confidential surveys. Time 1 data were collected in person in group sessions (approximately 10-40 women per group) in large classrooms on campus. Data collection sessions were staffed by one of the principal investigators and 3-5 female research assistants. After completion of informed consent procedures, participants were given a packet containing copies of the measures. All measures were marked with a code number to maintain participant confidentiality. Participants completed the measures and returned them to the envelope packet. After returning the packet, participants were debriefed and paid $25. Data for Time 2 through Time 9 were collected online using Prezza software via a code number that the women were given to link their answers with their confidential participant ID number from Time 1. Time 10 data were collected in person in large classrooms on campus with packets containing copies of the measures. Upon returning the Time 10 packet, participants were given up to $50 depending on the number of surveys completed between Time 2 and Time 10. Upon completion of the study, all data linking participants’ identification and their responses was destroyed.

Results

Preliminary Analyses

Participants were divided into four groups (total valid n = 345, 6 missing). Consistent with the approach taken by Goldstein and Flett (2009), three groups of individuals were identified who reported very high scores (one standard deviation above the mean) on
enhancement motives, coping motives or both. The high combined group (HI-COMB, $n = 20$) was formed by selecting individuals whose scores were greater than one standard deviation above the mean on both the coping and enhancement subscales of the DMQ-R. The high coping (HI-COP, $n = 44$) and high enhancement (HI-ENH, $n = 33$) groups were formed by selecting individuals whose scores were greater than one standard deviation above the mean for each subscale respectively. Finally, the non-externally motivated group (NON-INT, $n = 248$) consisted of participants whose scores were less than one standard deviation above the mean of the coping and enhancement subscales. Thus, the non-externally motivated group included all individuals who did not report very high levels of enhancement and coping drinking motives (but who may have endorsed moderate levels of such motives), in contrast to Goldstein and Flett who only included individuals who scored one standard deviation below the mean on both motives. The decision to include all other drinkers was made given the salience of enhancement motivations in a college sample, and in order to increase the ecological validity of any significant findings, by identifying only robust group differences.

**Analyses**

All analyses were conducted using PASW Statistics 18. Four sets of analyses were conducted, focusing on: 1) alcohol consumption variables, 2) alcohol-related problems, 3) general risky behavior (e.g., drug use, sexual behavior), and 4) alcohol-related sexual assault. In addition, analyses focused on cross-sectional relationships with data obtained at Time 1, as well as prospective relationships with data obtained 2-9 weeks following Time 1. MANOVA, MANCOVA, ANOVA, or ANCOVA were utilized to examine group differences on continuous variables; Chi Square analyses were utilized to examine group differences on rates of sexual assault, and on rates of fairly infrequent or non-normally distributed negative sequelae or risky
behavior (e.g., frequency of sex while under the influence of alcohol).

**Relationship between Motives and Historical Variables: Time 1**

The first set of analyses examined relationships between the four motive groups and reports of earlier consumption behavior and experiences prior to the study. Consumption variables typically focused on alcohol use in the previous month, whereas negative alcohol-related consequences were assessed in the past year (AUDIT), the past 3 years (RAPI), or the past 6 months (e.g., blackouts, alcohol-related injuries). Similarly, risky behavior was assessed for the past 6 months.

**Alcohol Consumption.** A MANOVA was conducted with motive group (HI-COMB, HI-COP, HI-ENH, NON-INT) as the independent variable, and age at first drink, highest number of drinks consumed on one occasion in the past 30 days, number of HED occasions (i.e., consuming four or more drinks in one setting) in the past month, and number of times becoming drunk or intoxicated in the past month as the dependent variables. The multivariate test, Wilks' $\Lambda = .82$, $F(12, 1008) = 6.65, p < .001$, was significant, as were all univariate tests (See Table 1 for means and standard errors). Tukey HSD post-hoc tests indicated that women in HI-ENH group had their first drink at an earlier age than women in the NON-INT group. All three high groups (HI-COMB, HI-COP, HI-ENH) reported more occasions of HED in the past month (defined as 4 or more drinks on one occasion) than the non-internally motivated group. The HI-COMB and HI-ENH groups reported “being drunk” more often in the past month than the non-internally motivated group. For highest number of drinks consumed in the past 30 days, HI-COMB and HI-ENH had significantly higher consumption than both HI-COP and NON-INT.

The finding that individuals high in enhancement motives tend to consume more alcohol is consistent with earlier studies (Cooper, 1994; Cooper, et al.1995; Kuntsche, et al., 2005;
Kuntsche, et al., 2006). Given this pattern, and based upon recommendations by previous researchers (e.g., Cooper, 1994; Kuntsche, et al., 2005), it is important to control for levels of alcohol use when examining drinking motives impact on negative alcohol-related consequences and related risky behavior. This is particularly relevant to the current study, given earlier findings that high levels of alcohol use explain the link between enhancement motives (but not coping motives) and negative alcohol-related outcomes (Kuntsche et al., 2005).

**Alcohol Related Problems.** A MANCOVA was conducted to examine differences between the groups with regard to negative alcohol-related consequences (controlling for alcohol consumption), with motive group (HI-COMB, HI-COP, HI-ENH, NON-INT) as the independent variable, highest number of drinks in the past 30 days as the covariate, and blackouts, injuries to self/others, RAPI total score, AUDIT total score, AUDIT consumption subscale, and AUDIT problems subscale as the dependent variables. The multivariate test, Wilks' $\Lambda = .88$, $F(15, 977) = 3.16, p < .001$ was significant. Except for blackouts and injuries to self/other, all univariate tests were significant (See Table 2 for means and standard errors). Tukey HSD post-hoc tests indicated that the HI-COP group had higher RAPI scores than the HI-ENH and NON-INT groups. For the AUDIT total score, the HI-COP had a higher score than the NON-INT group, with an identical pattern for the AUDIT consumption subscale and the AUDIT problems subscale.

**Risky Behavior.** A MANCOVA was conducted to examine differences between the groups with regard to risky behavior, controlling for alcohol consumption, with motive group (HI-COMB, HI-COP, HI-ENH, NON-INT) as the independent variable, highest number of drinks in the past 30 days as the covariate, and rates of marijuana use, mixing drugs and alcohol, drinking and driving after 5 or more drinks, sex with a stranger, sex under the influence of
alcohol with a regular partner and with a stranger, and sex under the influence of drugs other than alcohol with a regular partner and with a stranger in the past 6 months as dependent variables. The multivariate test, Wilks' Λ = .84, F(24, 1094) = 2.74, p < .001, was significant. All univariate tests, except for mixing alcohol and drugs and sex under the influence of alcohol with a stranger, were significant (see Table 3 for means and standard errors). Despite a significant univariate test, Tukey HSD post-hoc tests found no between group differences for marijuana use and sex with a stranger. However, the HI-COP group reported a higher frequency of sex under the influence of alcohol with a regular partner than the NON-INT group. In contrast, for frequency of sex under the influence of drugs (other than alcohol), the HI-COMB group was higher than NON-INT for a regular partner, and HI-ENH was higher than NON-INT for a stranger. For drinking and driving after 5 or more drinks, the HI-COP group had a higher frequency than the HI-COMB and the NON-INT groups; the HI-ENH group was also higher than the HI-COMB group.

**History of Sexual Assault.** A chi-square analysis was used to examine the relationship between motive groups and history of alcohol-facilitated sexual assault (AFSA) after age 14. Overall, 34.2% of women reported AFSA prior to the study. The percentage of participants who had a history of alcohol-related sexual assault differed significantly by motivation group, χ² (3, N = 395) = 12.36, p = .006 (See Table 7). Follow up chi-square analyses indicated that when compared to the NON-INT group, women in the HI-COP group were more likely than expected to have experienced AFSA. Also, 55.6% of women in the HI-COP group reported a history of AFSA, nearly double the 30% of women in the NON-INT group with a history of AFSA.

**Summary.** Findings examining historical variables are consistent with earlier studies (Cooper, 1994; Kuntsche, et al. 2005; Read, et al. 2010), which indicated that enhancement
drinkers tend to report higher levels of alcohol consumption compared to other groups, although all groups reported AUDIT scores (> 7) which may be indicative of hazardous drinking (Babor, et al., 2001). However, coping-motivated drinkers reported higher levels of alcohol-related problems commonly found in adolescents or college students (RAPI; White & Labouvie, 1989), consistent with earlier studies suggesting more alcohol-related problems among coping drinkers (Kassel, Jackson, & Unrod, 2000). It is noteworthy that the groups did not differ with regard to frequency of marijuana use or mixing drugs and alcohol. Fewer studies have examined sexual behavior or sexual assault in relation to drinking motives. In the current study, coping drinking motives were significantly associated with a history of sexual assault, and with alcohol-related risky sexual behavior with a regular partner in the previous 6 months. However, enhancement drinkers reported higher rates of drug-related risky sexual behavior with a stranger in the previous 6 months, and enhancement-coping drinkers reported higher rates of drug-related risky sexual behavior with a regular partner in the previous 6 months. Thus, all 3 groups of internally motivated drinkers engaged in more risky sex, but the context varied, with enhancement drinkers’ sex more likely to involve drug use.

Prospective Relationships: Predicting Consumption & Risky Behavior from Motives

The second set of analyses examined relationships between the four motive groups and reports of alcohol consumption, alcohol-related problems, risky behavior and sexual assault during the 9-week study. Consumption variables focused on average number of drinks (defined as a standard drink) per drinking occasion, whereas negative alcohol-related consequences were assessed in the past 9 weeks with the (RAPI), or a frequency count of particular negative outcomes (e.g., blackouts). Negative outcomes and risky behavior were assessed for the previous 9 weeks and aggregated into three categories: never, once only, or more than once.
Similarly, sexual assault was aggregated into two categories: none or once (or more).

**Alcohol Consumption.** A one-way ANOVA was used to assess differences in consumption, defined as average number of drinks per drinking occasion for Weeks 2-10, by motivation group. The test was significant, $F(3, 289) = 9.88, p < .001$. Tukey HSD post hoc comparisons indicated significant differences between all three high groups (HI-COMB $M = 7.29, SD = 2.26$; HI-COP $M = 5.89, SD = 2.49$; HI-ENH $M = 6.77, SD = 2.78$) and the NON-INT group ($M = 4.43, SD = 3.17$), but no significant differences among the high groups.

**Negative Alcohol-Related Consequences.** A series of Chi Square analyses were conducted to assess the association between drinking motives and negative alcohol-related consequences of blackouts or injury to self/others, and an ANCOVA was conducted to assess differences by motivation group for the Time 10 RAPI, controlling for alcohol use (average number of drinks per drinking occasion). The proportion of participants experiencing blackouts over the nine-week period differed significantly by motivation group, $\chi^2(6, N = 407) = 28.86, p < .001$ (See Table 4). Follow up chi-square analyses indicated that a greater proportion of the HI-COMB and HI-ENH groups experienced blackouts than expected, and that a smaller proportion of the NON-INT group reported blackouts than expected. Furthermore, compared to the HI-COP group, the HI-ENH group was more likely than expected to report blackouts. The proportion of participants experiencing an injury to self/other also differed by motivation group, $\chi^2(6, N = 407) = 42.35, p < .001$ (See Table 4). Follow up chi-square analyses indicated that all three high groups reported higher rates of injuries than expected, whereas the NON-INT group reported lower rates of injuries than expected, but there were no differences among the three high groups. The ANCOVA test for the Time 10 RAPI was significant, $F(3, 383) = 6.23, p < .001$. Tukey HSD post-hoc comparisons indicated a significant difference between the HI-COP ($M =$
8.40, SD = 6.76) and the NON-INT group (M = 4.23, SD = 5.43).

**General Risky Behavior.** Three chi-square analyses were conducted to assess the frequency of general risky behaviors including rates of marijuana use, mixing drugs and alcohol, and drinking and driving after 5 or more drinks (see Table 5). The proportion of women who used marijuana in the previous 9 weeks differed by motivation group, $\chi^2 (6, N = 407) = 52.38, p < .001$, with follow up chi-square analyses indicating the HI-COMB group having a higher frequency of marijuana use than expected, and the HI-COP, HI-ENH, and NON-INT groups having lower than expected frequency of marijuana use. The HI-ENH group also differed from the NON-INT group. The proportion of women who mixed drugs and alcohol also differed by motivation group, $\chi^2 (6, N = 408) = 46.36, p < .001$. Follow up chi-square analyses indicated all three high groups having higher than expected frequencies and the NON-INT group having lower than expected frequencies. Additionally, the HI-COMB group was more likely to mix drugs and alcohol when compared to the HI-COP group. Finally, the percentage of participants who drank and drove after 5 or more drinks differed by motivation group, $\chi^2 (6, N = 414) = 24.08, p = .001$. Follow up chi-square analyses indicated that all three high groups drank and drove more frequently than expected.

**Risky Sexual Behavior.** Risky sex over the nine-week period was assessed as frequency of sex with a stranger, sex with a regular partner under the influence of alcohol, sex with a stranger under the influence of alcohol, sex with a regular partner under the influence of drugs, and sex with a stranger under the influence of drugs (see Table 6). The proportion of women who had sex with a stranger differed by motivation group ($\chi^2 (6, N = 415) = 36.57, p < .001$), with follow up chi-square analyses indicating all three high groups having sex with a stranger more frequently than expected, while the NON-INT group had sex with a stranger less often than
expected. The proportion of participants who had sex with a regular partner while under the influence of alcohol differed by motivation group, $\chi^2 (6, N = 409) = 59.69, p < .001$. Follow up chi-square analyses indicated that all three high groups had higher than expected frequencies, while the NON-INT group had lower than expected frequencies. The proportion of participants who had sex with a stranger under the influence of alcohol differed by motivation group, $\chi^2 (6, N = 409) = 29.20, p < .001$. Follow up chi-square analyses showed that the HI-COMB and HI-ENH group both had higher than expected frequencies, while the NON-INT group had lower than expected frequencies. The proportion of women who had sex with a regular partner under the influence of drugs other than alcohol differed by motivation group, $\chi^2 (6, N = 408) = 19.34, p = .004$. Follow up chi-square analyses indicated all three groups having a higher than expected frequency, and the NON-INT group having a lower than expected frequency. Finally, the proportion of women who had sex under the influence of drugs other than alcohol with a stranger differed by motivation group, $\chi^2 (6, N = 409) = 29.20, p < .001$. Follow-up chi-square analyses indicated that women in the HI-COMB group had higher than expected frequencies, while the HI-COP and NON-INT groups had lower frequencies than expected.

**Alcohol-Facilitated Sexual Assault.** Prospective experience of alcohol-facilitated sexual assault was also examined with a chi-square analysis. Overall, 8.7% of women reported experiencing an alcohol-facilitated sexual assault over the nine-week period. The percentage of women who experienced an alcohol-facilitated sexual assault differed by motivation group, $\chi^2 (3, N = 264) = 23.73, p < .001$. Follow up chi-square analyses indicated that women in the HI-COMB and HI-COP group reported higher rates of alcohol-facilitated sexual assault during the study than expected, whereas the NON-INT group reported lower rates of assault than expected.

**Summary.** Analyses of prospective data suggest that internal drinking motives predict
behavior, although differential patterns emerged based upon outcome of interest. Interestingly, there were no differences between internally-motivated drinkers in terms of alcohol consumption during the study, in contrast to differences seen retrospectively (at Time 1). Furthermore, all three internally-motivated groups reported more alcohol-related injuries to self and other, more blackouts, and more risky sex compared to their non-internally motivated peers. Enhancement drinkers (whether high only or high on both) reported a greater frequency of blackouts during the study, although not more alcohol-related problems. Only coping motivated drinkers tended to report more general alcohol-related problems relevant to college students over the course of the study. Most notably, coping motivated drinkers reported the highest rates of alcohol-related sexual assault during the study. All of the internally-motivated drinkers appear to have a general risk-taking tendency, as women in these groups reported higher rates of drinking and driving, higher rates of drug use, and mixing alcohol and drugs. However, enhancement-motivated drinkers (again whether high only or high on both) appear to engage in riskier sexual practices, reporting higher frequencies of risky sex with strangers (compared to risky sex with a regular partner).

Discussion

The results of this study confirm the drinking trends discovered by previous researchers (e.g. Grucza, et al., 2009; Wechsler, Lee, Kuo, & Lee, 2000): frequent heavy episodic drinking is a disturbingly common experience for many college women. This pattern was evident across the entire sample, as even the non-internally motivated group—the group with the lowest risk-taking and least severe drinking patterns—reported recently consuming an average of more than 5 drinks per drinking occasion at the study’s outset. Prospective patterns of drinking behavior across the subsequent nine weeks also supported this trend, with the range of the average number
of drinks per drinking occasion reaching the level of heavy episodic drinking (Min: NON-INT = 4.43, Max: HI-COMB = 7.29). Another strong indicator of the problematic levels of drinking in the current sample was the average AUDIT score. The AUDIT, used by the World Health Organization (WHO) as a screening tool for a possible alcohol use disorder (AUD), has a cut-off score of 7 recommended for women. The average score in the entire sample was greater than 8, meaning that the drinking patterns of the average participant were at clinically dangerous levels. However, as expected, this elevation was actually accounted for by the internally-motivated drinkers (see Table 2 for individual means). Still, it is worth noting that even women who did not endorse high levels of internal drinking motives were drinking in a very dangerous manner.

Consistent with earlier retrospective studies (e.g. Cooper, 1994; Cyders & Coskunpinar, 2010; Lyvers, et al., 2010; Yusko, Buckman, White, & Pandina, 2008), those who endorsed high enhancement motives experienced high levels of negative consequences. The average AUDIT score for the high enhancement group was a troubling 12.03, and consistent with Lyvers, et al. (2010), the enhancement-motivated drinkers scored high on the consumption subscale of the AUDIT (M = 7.07). Blackouts were extremely common this group, both prior to and during the study. Over the nine weeks, 54.3% of women in the high enhancement group experienced more than one blackout, nearly twice the overall rate of the entire sample (27.8%). Women who endorsed high enhancement motives were also at a much greater risk for injuries to self/others as a result of their drinking. The high enhancement group was nearly 10 times more likely to report multiple injuries compared to the sample overall (22.9% of HI-ENH versus 2.7% overall).

Because blackouts and injuries are highly dependent on levels of consumption, it is expected that risk increases as a function of total drinks consumed. Thus it is unclear how much impact drinking motives may have on these problems. Indeed, after controlling for alcohol
consumption as recommended (Kuntsche, et al., 2005), blackouts and injuries were not significantly associated with enhancement motives, and results of the current study were consistent with previous studies that showed that coping-motivated drinkers were at the greatest risk for experiencing alcohol-related problems (Goldstein, et al., 2010; Kong & Bergman, 2010; Lyvers, et al., 2010; Martens, et al., 2008). After controlling for alcohol use, women in the high coping group scored significantly higher on the AUDIT, indicating hazardous drinking and potentially diagnosable problems. Coping-motivated drinkers also scored highest on the RAPI (after controlling for alcohol consumption), significantly higher scores than both the high enhancement groups (see Table 2 for means). The RAPI may be a better indicator of problems among college women, as it includes items such as “Not able to do your home work or study for a test,” “caused shame or embarrassment to someone,” and “had a bad time,” which assess problems college students face regularly compared to the more diagnostically oriented items of the AUDIT, such as “How often in the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?” or “How often during the last year have you found that once you were not able to stop drinking once you had started?”

Women who endorsed high coping motives also were at the greatest risk of alcohol-facilitated sexual assault. Over half of the women in the high coping group (55.6%) reported experiencing an alcohol-facilitated sexual assault prior to the study. Additionally, 26.5% of the high coping group experienced an alcohol-facilitated sexual assault during the study, a rate more than three times that of the overall sample (8.7%). As previous research has shown, a woman’s risk of sexual assault increases with alcohol consumption (Abbey, 2002; McCauley, Ruggiero, Resnick, & Kilpatrick, 2010; Mohler-Kuo, et al., 2004; Parks & Fals-Stewart, 2004), and given the high percentage of alcohol-facilitated sexual assault (retrospectively and prospectively)
among the coping-motivated drinkers, it is highly likely that some of these women were revictimized over the course of the study. Numerous researchers have investigated the link between revictimization and problematic drinking (McCauley, Calhoun, & Gidycz, 2010; Messman-Moore, Ward, & Brown, 2009; Testa, Hoffman, & Livingston, 2010), and have established a clear link between the two factors. While it is impossible to assess the temporality of the endorsement of coping motives in relation to the first sexual assault, it appears that at least some women may be drinking to cope with a previous experience of sexual assault. This unfortunately places them at greater risk for revictimization, reflecting a cyclical pattern of trauma and drinking to cope.

Risky alcohol use is also associated with risk taking in other domains, including marijuana use and risky sexual behavior. With a few exceptions (e.g. Cooper, Agocha, & Sheldon, 2000; Patrick, Schulenberg, O’Malley, Johnston, & Bachman, 2011; Tubman, Wagner, & Langer, 2003), researchers studying drinking motives have neglected to examine such correlates. The present study investigated a wide range of general risky behaviors (e.g. marijuana use, mixing drugs and alcohol, drinking and driving) as well as risky sexual practices (e.g. sex with a stranger, sex under the influence of alcohol, sex under the influence of drugs) to try to gain a clearer picture of the differences in risk taking among the four groups. The high enhancement group was at the greatest risk for drinking and driving retrospectively and prospectively, and also had high rates of marijuana use (37.2% used marijuana at least once over the course of the study). The women in the high coping group did not engage in as much drug use, but they were more likely to engage in sex with a regular partner under the influence of alcohol than the non-externally motivated group. However, it was the high combined group that by far reported the most marijuana use as well as engaged in the most risky sexual practices.
Over the course of the study, 65.0% of the high combined group used marijuana more than once (compared to 15.2% overall), and 50% of the high combined group mixed drugs and alcohol more than once (compared to 13% overall). The high frequency of drug use also merged into the risky sex domain, as women in the high combined group were an astounding 21 times more likely to engage in sex with a stranger under the influence of drugs than the overall sample (10.5% of high combined versus 0.5% overall). It is also worth noting that the high combined group was also at increased risk for an alcohol-facilitated sexual assault during the study (25% of high combined versus 8.7% overall). Indeed the high combined group showed a “mixed” pattern; it had unique outcomes while also sharing results consistent with both the high coping and high enhancement group.

The current study is one of the first to investigate alcohol consumption, negative consequences, and risky behavior in relation to internal drinking motives both independently and in combination, and has several points of strength. First, we employed commonly used and well-respected measures of negative drinking consequences, the RAPI and AUDIT, which allow for comparisons with earlier studies. Additionally, the specificity of addressing risky behavior in both general and sexual domains helped to paint a complete picture of college women’s behavior, and parse out small but meaningful differences between the motivation groups. While the sexual assault data was quite troubling, it adds another important dimension when trying to contextualize college women’s drinking behavior. The fairly large all-female sample was another important aspect of the study, given that women are approaching consumption levels of men (Grucza, et al., 2009; Wechsler, et al., 2000), and that men and women often endorse different drinking motives (LaBrie, et al. 2011). Finally, the inclusion of prospective data was an important improvement over previous studies, as it allowed us to determine that high internal
drinking motives actually predicted behavior.

While a good step forward, this study was not without its limitations. First, the sample was only comprised of college women, and had little ethnic or socio-economic diversity, limiting its generalizability. However, researchers suggest that college women (compared to their same-aged peers) are at the greatest risk for problems associated with alcohol use (Ham & Hope, 2003; Sugarman, DeMartini, & Carey, 2009). Another limitation was the relatively short time frame of the prospective part of the study, although there are very few prospective studies on drinking motives. Ideally future studies will be able to follow students for a full year or longer. Drinking during the study was assessed using weekly recall rather than daily-drinking diaries, which may have somewhat affected participant’s ability to recall exactly how much they drank on a specific day. However, the current study was far more interested in what happened on average than what happened on a day-to-day basis, so small errors in recall were not as harmful to our analyses. Furthermore, using weekly versus daily reporting likely reduced participant burden and increased retention.

From this study, there are still questions left to be answered. First, increased efforts must be made to understand individuals who strongly endorse more than one drinking motive. The mixed pattern of results seen in the high combined group do not point to one motive being “stronger” than the other in driving behavior, but rather each may impact behavior in equally problematic ways. In the future, researchers should examine additional variables such as sensation seeking or emotion dysregulation to help explain differences between those high in one or multiple internal drinking motives. Second, although we have revealed some disturbing relationships among internal drinking motives and risky behaviors in college women, without a comparison group it is difficult to determine whether these associations are unique to women, or
whether gender-based patterns in negative consequences exist. Future studies should continue to examine these issues with both men and women, and with emerging adults who are not enrolled in college.

Implications for intervention include trying to tailor intervention methods to motivational style rather than to pure behavior modification. This study demonstrates that when women drink for different reasons, their behavior looks different. Women who endorse high coping motives may benefit from approaches that employ mindfulness or emotion regulation strategies to help target underlying problems that need to be dealt with, while women who endorse high enhancement motives may benefit from a risk-reduction intervention approach.
References


Cooper, M.L. (2002). Alcohol use and risky sexual behavior among college students and youth:


Table 1
Differences in Alcohol Consumption at Time 1 by Motivation Group

<table>
<thead>
<tr>
<th></th>
<th>HI-COMB</th>
<th>HI-COP</th>
<th>HI-ENH</th>
<th>NON-INT</th>
<th>Wilks’A</th>
<th>Univariate F</th>
<th>Partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at first drink</td>
<td>15.40</td>
<td>16.02</td>
<td>15.24</td>
<td>16.22</td>
<td>0.82</td>
<td>3.49*</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(0.43)</td>
<td>(0.28)</td>
<td>(0.33)</td>
<td>(0.11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest # of drinks in past 30 days</td>
<td>10.90ab</td>
<td>6.45ac</td>
<td>9.59cd</td>
<td>5.14bd</td>
<td></td>
<td>25.01***</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>(0.87)</td>
<td>(0.57)</td>
<td>(0.68)</td>
<td>(0.23)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># of HED episodes in past 30 days</td>
<td>3.05a</td>
<td>2.15b</td>
<td>2.91c</td>
<td>1.52abc</td>
<td></td>
<td>18.94***</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(0.20)</td>
<td>(0.23)</td>
<td>(0.08)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># of times drunk in past 30 days</td>
<td>2.95a</td>
<td>2.13</td>
<td>2.88b</td>
<td>1.62ab</td>
<td></td>
<td>14.89***</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(0.19)</td>
<td>(0.23)</td>
<td>(0.08)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001

Note. Means (SE) in the same row with the same superscripts differ at p < .05.

Scale for # of HED episodes and # of times drunk should be interpreted as 0 = 0, 1 = 1, 2 = 2-4, 3 = 5-9, 4 = 10-20, 5 = 21-30, and 6 = 31+
### Table 2

*Differences in Alcohol Related Problems at Time 1 by Motivation Group Controlling for Alcohol Use*

<table>
<thead>
<tr>
<th></th>
<th>HI-COMB</th>
<th>HI-COP</th>
<th>HI-ENH</th>
<th>NON-INT</th>
<th>Wilks’ Λ</th>
<th>Univariate F</th>
<th>Partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blackouts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.68</td>
<td>1.43</td>
<td>2.00</td>
<td>1.07</td>
<td>0.88</td>
<td>0.87</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(0.29)</td>
<td>(0.18)</td>
<td>(0.24)</td>
<td>(0.08)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Injuries to self/others</strong></td>
<td>0.42</td>
<td>0.20</td>
<td>0.43</td>
<td>0.19</td>
<td></td>
<td>0.41</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(0.09)</td>
<td>(0.11)</td>
<td>(0.04)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RAPI</strong></td>
<td>23.11</td>
<td>20.77a,b</td>
<td>17.57a</td>
<td>10.77b</td>
<td></td>
<td>10.55***</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>(2.34)</td>
<td>(1.47)</td>
<td>(1.90)</td>
<td>(0.60)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AUDIT Total Score</strong></td>
<td>13.37</td>
<td>10.18a</td>
<td>12.03</td>
<td>7.00a</td>
<td></td>
<td>4.38**</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>(0.91)</td>
<td>(0.58)</td>
<td>(0.74)</td>
<td>(0.24)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AUDIT Consumption Subscale</strong></td>
<td>7.16</td>
<td>5.69a</td>
<td>7.07</td>
<td>4.29a</td>
<td></td>
<td>3.60*</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(0.41)</td>
<td>(0.26)</td>
<td>(0.33)</td>
<td>(0.11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AUDIT Problems Subscale</strong></td>
<td>6.21</td>
<td>4.50a</td>
<td>4.96</td>
<td>2.70a</td>
<td></td>
<td>3.53*</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(0.67)</td>
<td>(0.42)</td>
<td>(0.54)</td>
<td>(.17)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *p < .05, **p < .01, ***p < .001

Note. Means (SE) in the same row with the same superscripts differ at p < .05.

Scale for blackouts and injuries should be interpreted as 0 = 0, 1 = 1, 2 = 2-4, 3 = 5-9, 4 = 10-20, 5 = 21-30, and 6 = 31+.
Table 3
Differences in Risky Behavior at Time 1 by Motivation Group Controlling for Alcohol Use

<table>
<thead>
<tr>
<th>Behavior</th>
<th>HI-COMB</th>
<th>HI-COP</th>
<th>HI-ENH</th>
<th>NON-INT</th>
<th>Wilks' Λ</th>
<th>Univariate F</th>
<th>Partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana use</td>
<td>2.55 (0.35)</td>
<td>1.20 (0.23)</td>
<td>2.22 (0.28)</td>
<td>0.81 (0.09)</td>
<td>0.84 (0.06)</td>
<td>2.86* (0.02)</td>
<td></td>
</tr>
<tr>
<td>Mixing drugs and alcohol</td>
<td>1.85 (0.29)</td>
<td>0.78 (0.18)</td>
<td>1.47 (0.23)</td>
<td>0.52 (0.07)</td>
<td>1.84 (0.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking and driving after 5+ drinks</td>
<td>0.10a,b (0.12)</td>
<td>0.38a,c (0.08)</td>
<td>0.46b (0.10)</td>
<td>0.08c (0.03)</td>
<td>5.42** (0.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex with a stranger</td>
<td>1.00 (0.16)</td>
<td>0.53 (0.10)</td>
<td>0.88 (0.13)</td>
<td>0.26 (0.04)</td>
<td>2.77* (0.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex under the influence of alcohol-Regular partner</td>
<td>2.05 (0.37)</td>
<td>2.02a (0.23)</td>
<td>2.25 (0.29)</td>
<td>1.09a (0.09)</td>
<td>3.29* (0.03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex under the influence of alcohol-Stranger</td>
<td>0.70 (0.14)</td>
<td>0.40 (0.09)</td>
<td>0.81 (0.11)</td>
<td>0.22 (0.04)</td>
<td>1.67 (0.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex under the influence of drugs-Regular partner</td>
<td>1.20a (0.22)</td>
<td>0.58 (0.14)</td>
<td>0.59 (0.18)</td>
<td>0.21a (0.06)</td>
<td>3.32* (0.03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex under the influence of drugs-Stranger</td>
<td>0.10 (0.08)</td>
<td>0.18 (0.05)</td>
<td>0.31a (0.07)</td>
<td>0.04a (0.02)</td>
<td>3.61* (0.03)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001

Note. Means (SE) in the same row with the same superscripts differ at p < .05. Scale for all items should be interpreted as 0 = 0, 1 = 1, 2 = 2-4, 3 = 5-9, 4 = 10-20, 5 = 21-30, and 6 = 31+.
Table 4

Frequency of General Negative Consequences During 9 Week Study

<table>
<thead>
<tr>
<th></th>
<th>HI-COMB</th>
<th>HI-COP</th>
<th>HI-ENH</th>
<th>NOT-INT</th>
<th>Overall %</th>
<th>( \chi^2 ) (df)</th>
<th>Contingency Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>No blackouts</td>
<td>35.0%</td>
<td>56.5%</td>
<td>28.6%</td>
<td>66.3%</td>
<td>60.4%</td>
<td>28.86 (6)</td>
<td>.26***</td>
</tr>
<tr>
<td>Only one blackout</td>
<td>10.0%</td>
<td>10.9%</td>
<td>17.1%</td>
<td>11.4%</td>
<td>11.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than one blackout</td>
<td>55.0%</td>
<td>32.6%</td>
<td>54.3%</td>
<td>22.2%</td>
<td>27.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No injuries</td>
<td>85.0%</td>
<td>67.4%</td>
<td>62.9%</td>
<td>87.9%</td>
<td>83.3%</td>
<td>42.35 (6)</td>
<td>.31***</td>
</tr>
<tr>
<td>Only one injury</td>
<td>0.0%</td>
<td>26.1%</td>
<td>14.3%</td>
<td>9.2%</td>
<td>11.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than one injury</td>
<td>15.0%</td>
<td>6.5%</td>
<td>22.9%</td>
<td>2.9%</td>
<td>2.7%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*\( p < .05 \), **\( p < .01 \), ***\( p < .001 \)
Table 5
Prevalence of General Risky Behavior During 9 week study

<table>
<thead>
<tr>
<th></th>
<th>HI-COMB</th>
<th>HI-COP</th>
<th>HI-ENH</th>
<th>NON-INT</th>
<th>Overall %</th>
<th>$\chi^2$ (df)</th>
<th>Contingency Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>No marijuana use</td>
<td>30.0%</td>
<td>73.9%</td>
<td>62.9%</td>
<td>84.6%</td>
<td>78.9%</td>
<td>52.38 (6)</td>
<td>.34***</td>
</tr>
<tr>
<td>Marijuana use once</td>
<td>5.0%</td>
<td>6.5%</td>
<td>14.3%</td>
<td>4.9%</td>
<td>5.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marijuana use more than once</td>
<td>65.0%</td>
<td>19.6%</td>
<td>22.9%</td>
<td>10.5%</td>
<td>15.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No mixing drugs and alcohol</td>
<td>30.0%</td>
<td>71.7%</td>
<td>65.7%</td>
<td>85.7%</td>
<td>79.7%</td>
<td>46.36 (6)</td>
<td>.32***</td>
</tr>
<tr>
<td>Mixed drugs and alcohol once</td>
<td>20.0%</td>
<td>6.5%</td>
<td>14.3%</td>
<td>5.9%</td>
<td>7.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed drugs and alcohol more than once</td>
<td>50.0%</td>
<td>21.7%</td>
<td>20.0%</td>
<td>8.5%</td>
<td>13.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No drinking and driving after 5+ drinks</td>
<td>70.0%</td>
<td>67.4%</td>
<td>68.6%</td>
<td>88.5%</td>
<td>83.6%</td>
<td>24.08 (6)</td>
<td>.23**</td>
</tr>
<tr>
<td>Drinking and driving after 5+ drinks once</td>
<td>10.0%</td>
<td>13.0%</td>
<td>8.6%</td>
<td>4.8%</td>
<td>6.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking and driving after 5+ drinks more than once</td>
<td>20.0%</td>
<td>19.6%</td>
<td>22.9%</td>
<td>6.7%</td>
<td>10.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001
<table>
<thead>
<tr>
<th>Description</th>
<th>HI-COMB</th>
<th>HI-COP</th>
<th>HI-ENH</th>
<th>NON-INT</th>
<th>Overall %</th>
<th>$\chi^2$ (df)</th>
<th>Contingency Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sex with a stranger</td>
<td>35.0%</td>
<td>60.9%</td>
<td>51.4%</td>
<td>77.7%</td>
<td>71.6%</td>
<td>36.57 (6)</td>
<td>.29***</td>
</tr>
<tr>
<td>Sex with a stranger once</td>
<td>15.0%</td>
<td>10.9%</td>
<td>14.3%</td>
<td>10.8%</td>
<td>11.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex with a stranger more than once</td>
<td>50.0%</td>
<td>28.3%</td>
<td>34.3%</td>
<td>11.5%</td>
<td>17.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No sex with a regular partner under the influence of alcohol</td>
<td>40.0%</td>
<td>50.0%</td>
<td>42.9%</td>
<td>74.4%</td>
<td>67.2%</td>
<td>59.69 (6)</td>
<td>.36***</td>
</tr>
<tr>
<td>Sex with a regular partner under the influence of alcohol once</td>
<td>5.0%</td>
<td>6.5%</td>
<td>0.0%</td>
<td>11.4%</td>
<td>9.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex with a regular partner under the influence of alcohol more than once</td>
<td>55.0%</td>
<td>43.5%</td>
<td>57.1%</td>
<td>14.3%</td>
<td>23.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No sex with a stranger under the influence of alcohol</td>
<td>80.0%</td>
<td>84.8%</td>
<td>85.7%</td>
<td>93.8%</td>
<td>91.4%</td>
<td>29.20 (6)</td>
<td>.26***</td>
</tr>
<tr>
<td>Sex with a stranger under the influence of alcohol once</td>
<td>5.0%</td>
<td>13.0%</td>
<td>5.7%</td>
<td>5.5%</td>
<td>6.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex with a stranger under the influence of alcohol more than once</td>
<td>15.0%</td>
<td>2.2%</td>
<td>8.6%</td>
<td>4.8%</td>
<td>6.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No sex with a regular partner under the influence of drugs</td>
<td>73.7%</td>
<td>84.8%</td>
<td>85.7%</td>
<td>95.1%</td>
<td>92.2%</td>
<td>19.34 (6)</td>
<td>.21**</td>
</tr>
<tr>
<td>Sex with a regular partner under the influence of drugs once</td>
<td>10.5%</td>
<td>6.5%</td>
<td>8.6%</td>
<td>1.9%</td>
<td>3.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HI-COMB</td>
<td>HI-COP</td>
<td>HI-ENH</td>
<td>NON-INT</td>
<td>Overall %</td>
<td>$\chi^2$ (df)</td>
<td>Contingency Coefficient</td>
</tr>
<tr>
<td>----------------------------------------------------------------</td>
<td>---------</td>
<td>--------</td>
<td>--------</td>
<td>---------</td>
<td>-----------</td>
<td>--------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Sex with a regular partner under the influence of drugs more than once</td>
<td>15.8%</td>
<td>8.7%</td>
<td>5.7%</td>
<td>2.9%</td>
<td>4.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No sex with a stranger under the influence of drugs</td>
<td>78.9%</td>
<td>97.8%</td>
<td>97.1%</td>
<td>98.4%</td>
<td>97.3%</td>
<td>48.15 (6)</td>
<td>.33***</td>
</tr>
<tr>
<td>Sex with a stranger under the influence of drugs once</td>
<td>10.5%</td>
<td>2.2%</td>
<td>2.9%</td>
<td>1.6%</td>
<td>2.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex with a stranger under the influence of drugs more than once</td>
<td>10.5%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001
<table>
<thead>
<tr>
<th></th>
<th>HI-COMB</th>
<th>HI-COP</th>
<th>HI-ENH</th>
<th>NON-INT</th>
<th>Overall %</th>
<th>$\chi^2$ (df)</th>
<th>Contingency Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of alcohol-related sexual assault</td>
<td>36.8%</td>
<td>55.6%</td>
<td>41.9%</td>
<td>30.0%</td>
<td>34.2%</td>
<td>12.36(3)</td>
<td>0.18***</td>
</tr>
<tr>
<td>Alcohol-related sexual assault T2-10</td>
<td>25.0%</td>
<td>26.5%</td>
<td>8.7%</td>
<td>4.2%</td>
<td>8.7%</td>
<td>23.73(3)</td>
<td>0.29***</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001