PREDICTING USE OF ALCOHOL HARM REDUCTION STRATEGIES BY COLLEGE STUDENT DRINKERS

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ABSTRACT

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The aims of the current project were to identify cognitive and behavioral factors that are associated with college students' use of alcohol-reduction strategies and alcohol-safety-and-health strategies during or after drinking. Students who reported drinking alcohol in the previous month (n = 585) were recruited from Bowling Green State University to complete an online survey asking about their recent use of alcohol harm reduction strategies, health beliefs, alcohol expectancies, expectancy-values, drinking history, and background information. Hierarchical linear regressions indicated that the more frequently students engaged in alcohol-reduction strategies, the less frequently they binge drank, the more they evaluated cognitive and behavioral impairment as negative, the more they rated drinking-related health outcomes as severe, and the less they expected to be aggressive, courageous, sociable, and to take risks when drinking. More frequent use of alcohol-safety-and-health strategies were related to being female, experiencing alcohol-related outcomes less frequently, viewing drinking-related outcomes as more severe, holding more positive valuations of tension reduction, increased sociability and increased sexuality, and possessing more negative valuations of being more courageous and aggressive, taking risks, and self-perception. Assessment of attitudes that are associated with less use of strategies, such as positive valuation of cognitive and behavioral impairment and viewing drinking outcomes as less severe, could help identify students who may be more prone to drinking-related problems. Clinical interventions designed to increase the use of harm reduction strategies could provide accurate

information on the severity of negative drinking outcomes for college students and create individualized harm reduction strategies that are matched with young adults' specific outcome expectancies and values.

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TABLE OF CONTENTS

Page

INTRODUCTION….. 1

Alcohol Harm Reduction and Compensatory Behavior 2

Harm Reduction 2

Behavioral Compensation 5

Alcohol Outcome Expectancies 8

Alcohol Expectancy-Values 11

Perceived Health Beliefs 13

Pilot Study: Assessing the Utility of Behavioral Compensation Strategies 15

Aims of Present Study: Predicting Use of Alcohol Harm

Reduction Interventions 18

METHOD…… 21

Participants…. 21

Procedure……. 21

Measures…….. 22

Alcohol-Reduction Strategies – Past Use (ARS-Past) 22

Alcohol-Safety-and-Health – Past Use (ASH-Past) 22

Brief Comprehensive Effects of Alcohol (B-CEOA) 23

Alcohol Outcome Perceived Susceptibility and Severity (AOPSS) 25

Alcohol Outcome Perceived Susceptibility and Severity (AOPSS) 25

Susceptibility Scale 25

Severity Scale 26

AOPSS Value Scale 26
AOPSS Consequence Scale 27
Perceived Benefits and Barriers of Harm Reduction (PBB-HR) 27
Value on Health Scale 28
Young Adult Alcohol Problems Screening Test (YAAPST) 28
College Alcohol Problems Scale-revised (CAPS-r) 29
Demographics and Drinking History Questionnaire 30
Summary of Hypotheses 30
RESULTS 32
Preliminary Analyses 32
Participants' Demographic Information 32
Participants' Alcohol Use and Drinking-Related Consequences 32
Participants' Drinking Expectations, Expectancy-Values, and Health Beliefs 33
Participants' Recent Use of Alcohol-Reduction Strategies 35
Participants' Recent Use of Alcohol-Safety-and-Health Strategies 36
Predictor Variables for Inclusion in Primary Analyses 37
Demographics, Alcohol Use, and Drinking Outcomes 37
Alcohol Expectancies, Expectancy-Values, and Health Beliefs 39
Primary Analyses 39
Predicting Recent Use of Alcohol Harm Reduction Strategies 39
Predicting Recent Use of Alcohol-Reduction Strategies (ARS-Past) 40

Predicting Recent Use of Alcohol-Safety-and-Health Strategies (ASH-Past) 41

Predicting Recent Use of Alcohol Harm Reduction Strategies with a Modified Sample 42

Predicting Recent Use of Alcohol-Reduction Strategies with a Modified Sample 42

Predicting Recent Use of Alcohol-Safety-and-Health Strategies with a Modified Sample 43

Health Value as a Mediator Between Perceived Severity and Susceptibility and Harm Reduction 44

Path 1: Severity, Health Value, and Alcohol-Reduction Strategies 44

Path 2: Susceptibility, Health Value, and Alcohol-Reduction Strategies 44

Path 3: Severity, Health Value, and Alcohol-Safety-and-Health Strategies 45

Path 4: Susceptibility, Health Value, and Alcohol-Safety-and-Health Strategies 45

Supplementary Analyses 46

Participants' Demographics, Alcohol Use, and Drinking Outcomes 46

Intention to Use Specific Harm Reduction Strategies 47

DISCUSSION 49

Limitations 51

Implications and Future Directions 54

REFERENCES 59

APPENDIX A. DEFINITIONS OF BEHAVIORAL COMPENSATION GENERATED BY FOCUS GROUP 83

APPENDIX B. BEHAVIORAL COMPENSATION STRATEGIES GENERATED BY FOCUS GROUP PARTICIPANTS 84

APPENDIX C. ARS-PAST 86

APPENDIX D. ASH-PAST 88

APPENDIX E. B-CEOA 90

APPENDIX F. AOPSS 92

APPENDIX G. PBB-HR 96

APPENDIX H. VHS 97

APPENDIX I. YAAPST 98

APPENDIX J. CAPS-R 100

APPENDIX K. BACKGROUND INFORMATION 101

APPENDIX L. INFORMED CONSENT & HUMAN SUBJECTS REVIEW BOARD APPROVAL 104

LIST OF TABLES

Table		Page
1	Characteristics of Participants	69
2	Participants' Alcohol Use History	71
3	Drinking-Related Outcomes Experienced by Participants During the Previous Year	73
4	Frequency of AOPSS Consequences Experienced by Participants	75
5	Alcohol-Reduction Scale (ARS-Past): Means and Standard Deviations for Each Strategy	77
6	Alcohol-Safety-and-Health Scale (ASH-Past): Means and Standard Deviations for Each Strategy	79
7	Correlations Among Regression Predictor and Outcome Variables (Excluding Demographic Variables)	80
8	Hierarchical Regression Predicting Recent Use of Alcohol-Reduction Strategies	81
9	Hierarchical Regression Predicting Recent Use of Alcohol-Safety-and-Health Strategies	82

INTRODUCTION

According to the 2009 report from the National Survey on Drug Use and Health, 130.6 million Americans age 12 and over drink alcohol (Substance Abuse Mental Health Services Administration, 2010). Surveys across numerous American colleges assessing thousands of students have found that approximately 40 to 45% of students have engaged in recent binge drinking (i.e., consumption of at least five drinks by men or at least four drinks by women in a single occasion) (O'Malley & Johnston, 2002; Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002; Wechsler & Nelson, 2008). This ubiquitous, heavy drinking by American college students is associated with numerous health and social problems with individuals and on college campuses (Ham & Hope, 2003; Wechsler et al., 2002; Siebert, Wilke, Delva, Smith, & Howell, 2003; Kriegler, Baldwin, & Scott, 1994; Courtney & Polich, 2009).

In a review of the literature on college student problem drinking, Ham and Hope (2003) suggested that 18 to 22-year-olds in college are at greater risk of negative drinking consequences compared to their non-enrolled peers, and that these problems progress along a continuum from initially careless (e.g., missing class) to more extreme (e.g., arrests). A study conducted by Siebert et al. (2003) found significant correlations between drinking and harmful consequences in a study of 1,110 college students. Within the one-year reporting period, 45% of respondents did something they would later regret, 38% forgot where they were or what they did, 25% physically injured themselves, 23% had unprotected sex, and, within the most recent 30 days, 17% had driven after consuming at least five drinks (Siebert et al., 2003).

An earlier study by Kriegler et al. (1994) evaluated the negative impact of alcohol use on college students in health professions (e.g. medicine, nursing, pharmacy, dentistry, allied health). Of 981 respondents, 76% had accepted a ride with a driver under the influence, 20% had

experienced blackouts, 19% had missed class/work due to a hangover, and 13% reported having gone to class/work under the influence. Furthermore, 2-5% of this sample received lower grades/evaluations, encountered legal problems, took drugs from their employer/training site, interacted with patients while under the influence, had marital/relationship problems or encountered financial problems. Of even more concern, Hingson, Heeren, Zakocs, Kopstein, and Wechsler (2002) calculated that, each year, 1,400 college students are killed and 500,000 are injured from unintentional alcohol-related accidents.

Alcohol Harm Reduction and Compensatory Behavior

Harm Reduction. Given the prevalence of heavy drinking and negative consequences experienced by college drinkers, adopting a harm reduction approach may prove useful. The goal of harm reduction is to minimize negative consequences of ongoing drinking and drug use through interventions that preserve users' health while accepting that alcohol and drugs are a part of society and reducing harm is integral to our nation's public health (Ritter & Cameron, 2006). Harm reduction is intended to motivate safer and healthier use for individuals who may not be able, ready, or willing to abstain from substances (MacCoun, 1998; Marlatt, 1996).

Harm reduction interventions were initially developed for injection drug users to reduce the spread of blood-borne diseases such as hepatitis and human immunodeficiency virus (HIV) because sharing needles is a leading pathway of contagion (Strathdee & Vlahov, 2001). Examples of such harm reduction interventions include needle exchange programs and safer injection facilities that provide users with clean injection equipment and a sheltered environment in which to inject. Other harm reduction interventions are designed for the larger population of recreational (non-injection) drug users and include interventions such as drug potency testing and ingredient testing for illicit drugs such as ecstasy/MDMA. Many of these harm reduction

interventions are controversial, unavailable, and untested. However, some harm reduction interventions that are in use have been shown to be efficacious. For example, a literature review by Ritter and Cameron (2006) concluded that needle exchange programs reduce infectious disease rates and Hathaway and Tousaw (2008) reported that supervised injecting facilities reduce overdose. Furthermore, both interventions were found to be cost effective.

Harm reduction can be beneficial not only with illicit drug users, but also with alcohol users, such as college students, who may experience problems related to their drinking (Sugarman & Carey, 2007; Martens, Taylor, Damann, Page, Mowry, & Cimini, 2004). Alcohol harm reduction interventions, alternately referred to as protective strategies or self-protective behaviors, are designed either to reduce the quantity, frequency, or speed of alcohol consumption or to reduce biomedical, psychosocial, and legal consequences during or after drinking (Martens et al., 2004; Benton, Schmidt, Newton, Shin, Benton, & Newton, 2004). Examples of interventions designed to moderate alcohol consumption include avoiding drinking in rounds, drinking a non-alcoholic drink between each alcoholic drink, setting a pre-determined time to start and stop drinking, putting extra ice in a mixed drink, and ordering a non-alcoholic drink that can pass as an alcoholic drink (Bonar et al., 2011). Examples of interventions that promote health and safety include having a designated driver among a group of drinkers, drinking and traveling with responsible friends rather than alone or with strangers, staying hydrated while drinking alcohol, declining drink offers from people one does not know or trust, and carrying "emergency only" money (Rosenberg et al., in press).

Research has found that engaging in alcohol harm reduction interventions is associated with lower levels of alcohol consumption and fewer alcohol-related problems (e.g., Delva et al., 2004; Martens, Pedersen, LaBrie, Ferrier, & Cimini, 2007; Martens et al., 2004; Sugarman & Carey,

2007). Specifically, Delva et al. (2004) found a "dose-response" relationship such that college students who reported the most frequent use of protective behaviors (e.g., alternate between alcohol/non-alcohol, use a designated driver, track drinks, avoid drinking games) indicated experiencing the fewest alcohol-related problems (e.g., physical injury, fights, regret, unprotected sex). Benton et al. (2004) also reported that college students who reported consuming at least six drinks when partying were less likely to experience negative consequences of drinking if they engaged in self-protective strategies, and that this association was stronger for men than women. Furthermore, Ritter and Cameron (2006) found that interventions aimed at alcohol harm reduction, such as random breath testing and driver-education programs, reduce road accidents.

Research suggests that male and female college students are inconsistently employing different types of harm reduction interventions to reduce the harmful effects of their drinking. For example, when Delva et al. (2004) asked college students about the "self-protective behaviors" they "usually" or "always" used, 75% of women and 70% of men reported eating before or during drinking, 75% of women and 64% of men reported using a designated driver after drinking, 65% of women and 56% of men reported keeping track of their drinks, and about 40% of men and women avoided drinking games when partying or socializing. Walters, Roudsari, Vader, and Harris (2007) assessed the prevalence with which 15 protective behavioral strategies were used by college student drinkers. For females, the most frequently used strategy, reported by 94% of respondents, was monitoring the location of their drinks at all times. The three strategies used least frequently included alternating between alcoholic and non-alcoholic drinks, stopping drinking at a predetermined time, and putting extra ice in their drink (22% of women rated each option). The most frequently reported strategy by males was monitoring the

location of their drinks at all times (77%). The three strategies reported least frequently included having a friend let them know when they had enough to drink, stopping drinking at a predetermined time, and putting extra ice in their drink (17% of men rated each of these options). Other researchers have also found that college students use harm reduction strategies inconsistently and that females use more protective strategies than men (American College Health Association, 2011; Martens et al., 2004; Benton, et al., 2004; Sugarman & Carey, 2007; Werch, 1990; Hoffmann et al., 2011, April; Bonar, Rosenberg, & Hoffmann, 2011, June).

Use of harm reduction strategies varies not only by gender, but also by the amount of alcohol one consumes (Sugarman & Carey, 2007; Walters et al., 2007; Hoffmann et al., 2011, April; Bonar et al., 2011, June). For example, Walters et al. (2007) found that students who reported heavier drinking episodes were less likely to engage in protective behavioral strategies. However, Sugarman and Carey (2007) reported that the relationship between drinking level and engagement in protective strategies varied by type of harm reduction intervention. Specifically, those strategies that involved avoiding alcohol (e.g., refusing drinks, not drinking before going to the bar) and alternatives to drinking (e.g., practicing ways to be comfortable socially without alcohol use, finding other ways to reduce stress besides alcohol) were related to a lower average number of alcoholic drinks per week and lower blood-alcohol level (BAC). Strategies used during a drinking episode (e.g., drinking slowly, eating before and while drinking) were related to a higher average number of alcoholic drinks consumed per week and higher BAC.

Behavioral Compensation. Although harm reduction interventions could reduce alcohol problems before, during, and shortly after drinking, many drinkers also experience longer term negative effects from drinking. These latter consequences are not typically the focus of harm reduction interventions, but may be reduced if the drinker engages in compensatory behaviors.

Knauper, Rabiau, Cohen, and Patriciu (2004) suggest that many people who engage in unhealthy behaviors, such as drinking large amounts of alcohol, will often justify or "neutralize" their risky behavior by engaging in alternate or compensatory health behaviors. This theory is referred to as the Compensatory Health Belief Model.

Compensatory health beliefs (CHBs) are defined as beliefs that engaging in unhealthy, though oftentimes pleasurable, behaviors can be compensated for by engaging in another, healthy behavior (i.e., compensatory behavior) (Rabiau, Knauper, & Miquelon, 2006). The concept of CHBs is derived from the theory of cognitive dissonance and suggests that compensatory beliefs are more likely to occur "when the pleasure of indulging in a desired behavior stands in conflict with potentially negative (long-term) health effects" (Knauper et al., 2004, p. 608). The CHBs act as a "motivational catalyst" to resolve dissonance or internal conflict subsequent to engaging in the unhealthy behavior. Another purportedly important determinant of whether or not one uses compensatory health behaviors is the value that is placed on the outcome of engaging in the compensatory behavior (Rabiau et al., 2006). If the outcome of the unhealthy behavior is important to the person, he/she is more likely to engage in a compensatory behavior.

The Compensatory Health Belief Model can be illustrated using an example with eating habits (Knauper et al., 2004). Imagine a person who desires a piece of chocolate cake. If that desire conflicts with anticipating the unhealthy effects of this dessert, the person will experience cognitive dissonance. If this person is trying to lose weight, he/she is likely to consider how important his/her weight loss goal is, in addition to the nutritional value of the cake, in determining whether or not to eat the cake. Therefore, the CHB Model assumes that if the person chooses to eat the cake, he/she will also be more willing to engage in compensatory

behaviors (e.g., exercise) due to the high amount of internal conflict (e.g., guilt) experienced and the high value (i.e., importance) placed on his/her weight loss goal. This person may think "I can eat this cake because I will be exercising tonight," or "I will exercise now because I'm going to eat cake later." Exercise burns the calories consumed, which reduces guilt and is consistent with his/her weight loss goal.

The Compensatory Health Belief Model is a relatively new theory, and there is little research investigating its validity and utility. Knauper and colleagues (2004) created the Compensatory Health Beliefs Scale to assess the degree to which four specific health risk behaviors or symptoms (i.e., substance use, unhealthy eating/sleeping, stress, and regulating weight) could be compensated for by engaging in healthy behaviors (e.g., eating healthy, drinking a lot of water, exercising). Knauper et al. (2004) found that higher compensatory belief scores were related to lowered self-efficacy to resist alcohol. In addition, the substance use compensatory health belief subscale was a significant predictor of a higher amount of daily alcohol and number of alcoholic beverages consumed when drinking.

I believe that compensatory behaviors are similar to harm reduction interventions, and may have some of the same benefits. Both harm reduction interventions and compensatory behaviors suggest that engaging in alternate health behaviors may counter harmful effects of drinking. Specifically, harm reduction interventions (e.g., not driving under the influence, moderating alcohol intake, using a condom) are designed for immediate implementation, typically while engaging in high risk drinking behaviors. Compensatory behaviors promote use of healthy behaviors (e.g., healthy eating, exercising, not smoking) that may be undertaken anytime before or after drinking, or as part of a healthier lifestyle, to compensate for drinking. Therefore, I

believe that harm reduction interventions and compensatory behaviors serve two important functions, firstly, to reduce immediate harm and, secondly, to promote general health of drinkers.

Alcohol Outcome Expectancies

Outcome Expectancy Theory suggests that a person develops expectations of reinforcing effects of performing a behavior based on his/her learning history (Bandura, 1977; Del Boca, Darkes, Goldman, & Smith, 2002). Alcohol outcome expectancies (AOEs) can be defined as attitudes and beliefs that people hold about outcomes of alcohol consumption based on their own drinking and their observation of drinking by others (Del Boca et al., 2002; Jones, Corbin, & Fromme, 2001; Brown, Goldman, Inn, & Anderson, 1980).

Alcohol outcome expectancies (AOEs) are often categorized as desirable/positive outcome expectancies or undesirable/ negative outcome expectancies (Brown, Christiansen, & Goldman, 1987; Fromme, Stroot, & Kaplan, 1993; Jones et al., 2001; Ham & Hope, 2003). Positive AOEs can be defined as beliefs about the beneficial effects one anticipates from drinking alcohol and include sociability (e.g., outgoing, talkative), liquid courage (e.g., assertiveness, disinhibition), global positive change (e.g., having fun, pleasurable feelings and sensations), tension reduction (e.g., relaxation, reduced stress), and sexual enhancement. Negative AOEs are beliefs held about the detrimental effects of drinking and include risk and aggression (e.g., increased hostility, sexual risk-taking), psychological consequences (e.g., depression, anxiety), cognitive impairment (e.g., "blackouts," poor decision-making), motor impairment (e.g., slurred words, slowed reflexes), physical consequences (e.g., "hangover," nausea, alcohol poisoning), and self-perception (e.g., self-critical, problems seem worse).

Although the total number of alcohol expectancies reported by an individual is associated with increased alcohol consumption (Wood, Sher, & Strathman, 1996), research indicates that

positive and negative AOEs predict drinking differentially. Numerous studies indicate that positive AOEs consistently predict alcohol consumption with college drinkers, while the relationship between negative AOEs and drinking is more nuanced (e.g., Jones et al., 2001; Brown, Goldman, & Christiansen, 1985; Holyfield, Ducharme, & Martin, 1995; Fromme, Stroot, & Kaplan, 1993; Fromme & D'Amico, 2000). Some research with college drinkers has shown an association between negative AOEs and increased drinking, while other research suggests negative AOEs are associated with abstaining from drinking (e.g., Stacy, Widaman, Marlatt, 1990; Palfai & Ostafin, 2003; Jones & McMahon, 1996; McMahon, Jones, & O'Donnell, 1994; Fromme, Stroot, & Kaplan, 1993). For example, negative expectancy outcomes (e.g., depression, cognitive and motor impairment, hangover, missing work the day after drinking) are shown to predict heavier drinking with college students (Ham & Hope, 2003; McMahon et al., 1994).

Positive and negative AOEs frequently vary by gender and drinking status (O'Malley & Johnston, 2002; Mooney et al., 1987; Jones et al., 2001; Sher et al., 1996). For example, Jones et al. (2001) found that men tend to hold stronger positive AOEs and weaker negative AOEs compared to women. Specifically, Sher and colleagues (1996) found that male college students reported stronger expectations of tension reduction, social lubrication, activity, and performance enhancement than female students. Mooney et al. (1987) reported that both men and women expected more social and physical pleasure, and increased social assertion following drinking regardless of amount one normally consumed. However, more frequent drinking was associated with expectations of global positive effects, sexual enhancement, and social and physical pleasure in men, but with tension reduction in women (Mooney et al., 1987). Brown et al. (1987) provide further support that expectancies differ for heavier versus lighter drinkers.

Specifically, heavy drinking college students reported higher AOEs of social and physical pleasure and tension reduction compared to moderate and occasional drinkers. Furthermore, occasional drinkers expected less social and physical pleasure, social assertion, and tension reduction compared to moderate or heavy college drinkers.

Alcohol Outcome Expectancy Theory suggests that an individual may hold expectancies that are not necessarily valid (Jones et al., 2001); however, research indicates that alcohol expectancies reflect actual drinking outcomes experienced by college students (Mooney, Fromme, Kivlahan, & Marlatt, 1987; Wall, Thrussell, & Lalonde, 2003; Sher, Wood, Wood, & Raskin, 1996). As one specific example, Roehling and Goldman (1987) found that college students' alcohol expectancies are often associated with social outcomes (e.g., social pleasure, tension reduction), though not cognitive outcomes (e.g., cognitive and motor functioning). In a more recent study, Wall and colleagues (2003) found similarities between college student drinker's expectancies and experienced outcomes of drinking in a bar setting, with the exception that respondents reported feeling less aggressive post-drinking and were also less likely to engage in risky behavior, compared to their pre-drinking expectations.

Young men and young women continue to drink despite anticipating and experiencing negative outcomes. Why might this happen? One explanation is that positive AOEs are more salient and immediate for drinkers, because negative consequences occur infrequently in comparison (Stacy et al., 1990; Lewis & O'Neill, 2000; Palfai & Ostafin, 2002). Another possibility is that drinkers may ignore or discount potential negative consequences (Stacy et al., 1990). Although negative outcomes such as liver disease, divorce, and arrests are uncommon in college student drinkers, they are detrimental to the small percentage of college students who

experience them, and may have a damaging impact on friends, family, and community members (Ham & Hope, 2003).

Another explanation for why seemingly negative outcomes may not deter drinking is that college students may not view these outcomes as harmful or unsafe. In their 2008 study, Mallet, Bachrach, and Turrisi asked college freshmen to rate the valuation (positive, neutral, negative) of 16 "negative" expectancies. Experiencing a "hangover" was rated as positive by 25% of respondents, and an additional 28% rated this consequence as neutral. "Blacking out" and being late to class or work because of drinking the night before were rated as positive by 12%, and neutral by an additional 35% of participants. Vomiting was rated as positive by 9% and neutral by 14% of students. Additional outcomes that were rated by the majority of respondents as positive or neutral were binge eating (27% positive, 56% neutral), skipping an evening meal (26% positive, 56% neutral), waking in another's bed (16% positive, 42% neutral), and leaving a party alone (11% positive, 50% neutral). Results from Mallet et al. (2008) suggest that AOEs are not categorized uniformly as positive or negative, but instead vary across drinkers.

Alcohol Expectancy-Values

Expectancy-Value Theory asserts that a person will base his or her actions not solely on the likelihood of attaining goals, but on the value or importance placed on those goals (Borders, Earleywine, & Huey, 2004; Hayes, 1985). Expectancy-Value Theory has been used to explain a variety of health-related behaviors, including smoking (Rogers, Deckner & Mewborn, 1978), fighting and hyperactivity in class (Borders et al., 2004), and alcohol use (Del Boca et al., 2002; Levy & Earleywine, 2003; Hayes 1985; Jones & McMahon, 1996).

Combining the drinker's expectations of alcohol outcomes and his/her evaluation of these outcomes (i.e., good/bad, important/not important) may predict alcohol consumption better than

from expectancies alone. For example, people may be more likely to drink if they believe that they will be more social and outgoing when they drink, and if they place a great amount of importance on these outcomes. Numerous research studies have found an association between positive expectancy-values, such as importance placed on increased sociability or sexuality, and increased alcohol consumption (e.g., Leigh, 1987, Fromme & D'Amico, 2000; Werner, Walker, & Greene, 1993; McCarty, Morrison, & Mills, 1983).

Researchers have found that it is important to measure subjective valuation of both positive and negative AOEs when assessing the relationship between AOEs and drinking-related outcomes (McCarty et al., 1983, Fromme & D'Amico, 2000; Jones & McMahon, 1996; Leigh, 1987; Werner et al., 1993; Stacy et al., 1990; Fromme, Stroot, & Kaplan, 1993; Mallett, Bachrach, & Turrisi, 2008). For example, Werner et al. (1993) showed that more favorable evaluations of negative effects were associated with heavier drinking and more alcohol-related health consequences. In addition, Mallett et al. (2008) reported that college students' positive valuations of vomiting and regretting sexual experiences were associated with higher weekly alcohol consumption. In a treatment sample, Jones and MacMahon (1996) found that negative expectancy-values independently predicted post-treatment abstinence, whereas positive expectancy-values did not.

Research has also found that heavier drinkers evaluate alcohol expectancies and the experience of alcohol outcomes differently than lighter drinkers. For example, McCarty et al. (1983) reported that heavier drinkers experienced more alcohol outcomes of all kinds, compared to lighter drinkers, and that heavier drinkers rated positive effects as more pleasurable and negative effects as less negative, compared to lighter drinkers. Werner et al. (1993) also found that college students who drank more, and who reported more health problems, expected to be

more social and have greater sexual enhancement, and were less concerned about cognitive and behavioral impairment.

Perceived Health Beliefs

The Health Belief Model (HBM) is a theory of health behavior that identifies cognitive factors (e.g., information gathered, motivation level) that predispose individuals to engage in preventive health practices or to seek health services (Minugh, Rice, & Young, 1998; Becker, 1974; Rosentock, Strecher, & Becker, 1988). HBM (Redding, Rossi, Rossi, Velicer, & Prochaska, 2000; Janz & Becker, 1984) asserts that people will take action to prevent negative health outcomes, such as illness, based on (1) how vulnerable they feel to the outcomes (i.e., susceptibility), (2) how severe they view the outcomes (i.e., severity), (3) the perceived effectiveness of engaging in protective behaviors to reduce risk (i.e., benefits) and (4) the evaluation of the difficulty of or costs associated with engaging in preventive behaviors (i.e., barriers).

Historically, HBM factors have been studied in relation to health screening, prevention, and behavior change to deter illnesses such as cancer, influenza, hypertension, and diabetes (Janz & Becker, 1984). More recently, HBM has been evaluated as an explanation of a variety of substance-related illnesses, risks, and behaviors, including alcohol and tobacco use (Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004), sex while intoxicated or "high" (Lollis, Johnson, & Antoni, 1997), condom use while under the influence of alcohol (Boone & Lefkowitz, 2004) and injection drugs (Lollis, Antoni, Johnson, Chitwood, & Griffin, 1995), parent-child communication about alcohol use (Cremeens, Usdan, Brock-Martin, Martin, & Watkins, 2008), Hepatitis C risk with injection drug users (Davey, Richard, Lang, & Davies, 2006), substance use

among HIV-infected individuals (Welch, 2000), and adherence to antiretroviral medication (Kagee, 2008).

HBM has been found to predict engagement in harm reduction interventions relevant for college students, specifically, using a condom while under the influence of substances and moderating quantity and frequency of alcohol use (Von Ah et al., 2004; Lollis et al., 1995; Minugh et al., 1998; Boon & Lefkowitz, 2004). For example, Lollis et al. (1995) found that HBM factors explained 25% of the variance in condom usage by injection drug-using males (and use of alcohol, marijuana, and methadone explained an additional 21% of variance). Assessing the relationship between alcohol use and HBM factors in a large random sample drawn from the 1990 National Health Interview Survey, Minugh and colleagues (1998) found that health beliefs accounted for approximately 12% of the variance in amount of alcohol consumed, though HBM constructs accounted for only 4% of the variance in drinking frequency.

HBM research also indicates that beliefs about the effects of alcohol may not be consistent with health behaviors, and that individuals engage in health protective behaviors despite drinking. For example, Lollis et al. (1995) reported that injection drug users who drank greater amounts of alcohol were more likely to use condoms. In addition, Minugh et al. (1998) found that respondents who believed that alcohol is a risk factor for oral cancer were significantly more likely to drink greater amounts of alcohol. However, the same study also found that engaging in greater amounts of physical activity was significantly associated with more frequent drinking by women and with consuming larger quantities of alcohol by men.

Janz and Becker (1984) suggested that HBM might better predict health behaviors for those individuals who value their personal health highly. This idea resulted in a modified HBM to include health value, which refers to the extent to which individuals have an interest in and

concerns about their general health (Lau, Hartman, & Ware, 1986; Costa, Jessor, & Donovan, 1989). Some research has found that alcohol use and health behaviors can be better explained when health value is added to the HBM. For example, Lau et al. (1986) reported that health value was a moderator between efficacy beliefs (benefits minus barriers) and abstention from drinking in a sample of female college students. Costa et al. (1989) found that higher health value was related to increased physical activity and better dietary choices in a junior and senior high school sample and to increased seat belt use in the junior high sample. Harris (2004) also reported that health value served as a moderator between hardiness and health habits such as getting adequate sleep.

Other research suggests that there is no relationship between health values and behaviors commonly believed to put one at greater risk for negative health outcomes. For example, Minugh et al. (1998) found that respondents who evaluated their health favorably reported drinking alcohol on more days during the previous two weeks. In addition, Huxley and Grogan (2005) found that there was no relationship between health values, engagement in health behaviors, and tattooing or piercing one's body. Given the conflicting research regarding the utility of health value in explaining alcohol use and health behaviors, health value warrants further study as an addition to the present HBM.

Pilot Study: Assessing the Utility of Behavioral Compensation Strategies

Although some forms of behavioral compensation are different from harm reduction, as noted before, many strategies to preserve health and safety fit the definition of both behavioral compensation and harm reduction. Therefore, I conducted a pilot study to begin to assess whether university students understood the concept of behavioral compensation and could differentiate behavioral compensation from harm reduction. I held six focus groups with

undergraduate students recruited from psychology courses. The 16 focus group participants (one to five per group) included 11 females and five males; 13 participants reported their ethnicity was Caucasian, two identified as African American and one identified as multi-racial. Twelve participants were freshmen, two were sophomores, one was a junior and one was a senior. Fourteen of 16 participants reported binge drinking (consuming 5 or more drinks if male and 4 or more drinks if female) in the past month, averaging six binge drinking days during this time period. One participant reported drinking alcohol in the past month though not binge drinking during this period, and another participant reported having drunk alcohol previously though not in the past month.

To begin the focus group, I asked students to read and sign an informed consent page. Participants were then asked 1) to elaborate on negative outcomes, if any, they had experienced after drinking alcohol; 2) if they had heard of harm reduction and, if so, what it meant in relation to drinking alcohol; and 3) if they had heard of behavioral compensation and, if so, what it meant in relation to drinking alcohol. I then provided participants with a basic definition of each construct based on Rabiau et al. (2006) and Ritter and Cameron (2006) and asked them to provide examples of specific harm reduction and behavioral compensation strategies. I then listed these examples on a chalkboard and asked them to identify the similarities and differences between behavioral compensation and harm reduction strategies and to provide suggestions for how to further differentiate each of these constructs. At the end of each focus group, I asked participants to complete a brief questionnaire asking them to provide a definition of behavioral compensation, to list behavioral compensation strategies that they had used previously, that they had seen others use, or that they thought students might use, and to provide information about

their basic demographics and recent drinking history. Upon completion of the focus group, participants received one extra credit point in their psychology course.

Focus group results revealed that participants had difficulty understanding the concept of behavioral compensation. For example, participants described the construct as "preparing" for drinking, making "excuses" for drinking, or making amends to others for bad behavior that occurred while drinking. A complete list of behavioral compensation definitions is found in Appendix A. Relatedly, focus group participants struggled to identify differences between harm reduction and behavioral compensation strategies, describing both as "taking precautions," "trying to reduce harm," and "preventing trouble and hurt." When asked for specific examples of behavioral compensation strategies, the majority of focus group members identified eating prior to drinking alcohol and drinking water while they drink alcohol as strategies that college students may engage in to compensate for their alcohol use. Both of these strategies may also be classified as examples of harm reduction interventions (Bonar et al., 2011). See Appendix B for a complete list of behavioral compensation strategies identified by participants, as well as the frequency of each strategy.

Many focus group participants also indicated that behavioral compensation strategies may not be relevant for college drinkers. Some reported that this concept did not apply to them or stated "I don't think they [college students] think about this." Other participants noted that they engaged in specific strategies regularly (e.g., exercising, completing their homework), but not as ways to compensate for drinking. Two participants conceptualized behavioral compensation as behavioral intentions that may not necessarily translate into actions (e.g., "try to get homework done before going out, though I'll go out regardless" and "try to eat healthier if I know I'm going to drink, but late at night this goes out the tubes").

In summary, focus group results revealed that students had difficulty understanding and defining the construct of behavioral compensation, most often identifying it is as the same construct as harm reduction or believing it is preparation for drinking. Those participants who did generate examples of behavioral compensation strategies noted that 1) college students do not engage in behavioral compensation, 2) students intend to partake in behavioral compensation strategies, but are not successful at completing these behaviors, or 3) students engage in behavioral compensation strategies regularly regardless of their drinking behaviors. Given these findings, I concluded that I was unlikely to be able to develop a separate measure of behavioral compensation beliefs, and decided not to assess this construct in the present study.

Aims of Present Study: Predicting Recent Use of Alcohol Harm Reduction Interventions

Although harm reduction interventions have the potential to alleviate or lessen unhealthy alcohol-related problems experienced by college students, research suggests that this population does not engage in these practices consistently (e.g., Delva et al., 2004; Walters et al., 2007; Benton et al., 2004; Sugarman & Carey, 2007; Werch, 1990). Evaluating possible explanations for inconsistent use of harm reduction strategies may uncover ways to increase use of strategies, thereby reducing negative consequences of drinking.

Given that several investigations indicate that health beliefs are associated with engagement in two harm reduction interventions, condom use and moderate drinking (e.g., Boone & Lefkowitz, 2004; Lollis et al., 1995; Minugh et al., 1998), I hypothesized that HBM factors would predict engagement in a broad range of harm reduction strategies. Specifically, I hypothesized that those individuals who rated negative alcohol outcomes (i.e., alcohol poisoning, physical injury while under the influence of alcohol, "blacking out," feeling "hung over," engaging in risky sexual practices, feeling angry, experiencing a low mood, missing school or

work) as more severe and who believed they are more susceptible to these outcomes would have engaged more frequently in past use of harm reduction. Because health value has previously been associated with alcohol-related behaviors though not tested in relation to harm reduction specifically, I believed that a first step was to assess whether health value accounted for the relationship between severity and susceptibility and use of harm reduction strategies, as opposed to testing whether it merely strengthened these relationships. Specifically, I hypothesized that health value would mediate the relationship between severity of and susceptibility to negative outcomes and engagement in harm reduction interventions.

Research suggests that negative AOEs are associated with both increased drinking and abstinence (Stacy et al., 1990), and that drinkers' subjective evaluation of expectations and outcomes vary considerably (e.g., Mallett et al., 2008). Because negative AOEs may encourage drinkers to engage in safer and healthier alcohol use, I hypothesized that individuals who hold negative AOEs would have engaged in past use of harm reduction interventions more often, though only when they valued specific negative outcomes (i.e., expectancies rated by the drinker as bad if they were to occur). I also hypothesized that individuals' positive valuation of AOEs would be related to less frequent use of harm reduction strategies. This hypothesis was based on research showing that positive AOEs strongly predict alcohol consumption. Therefore, when a drinker values positive AOEs, there would be little perceived need to drink more safely to preserve one's health.

Research suggests that women engage in more frequent use of harm reduction interventions than men and light drinkers engage in more harm reduction interventions compared to heavier drinkers (e.g., Walters et al., 2007; Hoffmann et al., 2011, April). Therefore, I hypothesized that women would engage in harm reduction more frequently than men and

students who binge drink less would engage in protective behaviors more often than frequent bingers. I also hypothesized that drinkers who reported more negative drinking outcomes would engage less frequently in harm reduction than drinkers who experienced fewer negative outcomes.

In sum, the primary aims of the present study were to assess the relationships between health belief factors, alcohol expectancy outcomes, expectancy-values, personal drinking history, gender, and the frequency with which college drinkers engaged in both alcohol-reduction strategies and alcohol-safety-and-health strategies.

METHOD

Participants

A total of 628 undergraduate students enrolled at Bowling Green State University (BGSU) participated in the present study online. An additional 72 students partially completed the survey and did not submit it. To be eligible for inclusion in the data analyses, students must have been at least 18 years of age, been currently enrolled as an undergraduate student at BGSU, and have drunk alcohol at least one time in the past four weeks. Because they had not drunk alcohol in the past month, I excluded 27 participants. I excluded an additional 16 participants because 5% or more of their responses were missing across all survey questions. Therefore, the final sample for analysis comprised 585 undergraduate students.

Procedure

Following approval from the BGSU institutional review board, participants were recruited during April and May of 2011 using a web-based experiment notification system (Sona), flyers posted in campus buildings, e-mail notifications to psychology course instructors, and e-mails sent to a random subset of enrolled undergraduate students. Eligible respondents were directed to an online informed consent page and, subsequent to indicating consent, were asked to complete the measures on SurveyGizmo. The order of the questionnaires was randomized, except for the open-ended questions and demographic and drinking history questionnaire which were always presented last. As an incentive, participants were offered either one extra credit point in their psychology course or opportunity to win either one gift card worth $200, one of two gift cards worth $100, one of two gift cards worth $50, or one of four gift cards worth $25 to their choice of Amazon.com or Kroger. One hundred and twenty-one participants selected the opportunity to win a gift card. The survey was initially pilot tested with

15 graduate students to evaluate clarity of questions and instructions and took approximately 25 minutes to complete.

Measures

Alcohol-Reduction Strategies – Past Use (ARS-Past). This questionnaire asked respondents to rate how often during the previous four weeks they had used 31 different behavioral self-control skills to reduce the quantity or frequency of their alcohol consumption (e.g., leaving at least 15 minutes in between each drink, setting a pre-determined time to stop drinking, accepting a drink offer, then setting it aside without drinking it) (Hoffmann et al., 2011, April; Appendix C). Participants selected from the following six response options: *Never, About one-fourth of the time, About half the time, About three-fourths of the time, Almost always or always, Did not apply*. Items that participants' indicated did not apply to them were coded as missing data. Hoffmann et al. (2011, April) found the ARS-Past to have internal consistency reliability of .93 and a mean inter-item correlation of .31. The authors also reported several aspects of criterion validity. Specifically, the ARS-Past was negatively correlated with Alcohol Use Disorders Identification Test (r = -.34), average number of drinks consumed (r = -.39), and perceived control over drinking (r = -.31). There is also support for discriminant validity as the ARS-Past was weakly correlated with health-related self-efficacy (r = .18), sensation seeking (r = -.15), and impression management (r = .17). In the present sample, the ARS-Past had internal consistency reliability of .90 and a mean inter-item correlation of .23.

Alcohol-Safety-and-Health – Past Use (ASH-Past). This questionnaire asked respondents to rate how often during the past four weeks they had used 17 different behavioral self-control skills (e.g., carrying some cash with you that you would use only in an emergency, avoiding consuming drinks offered by people you do not know or trust, eating something before

or while drinking) that are used to preserve a drinker's health and safety during or directly after drinking (Bonar et al., 2011, June; Appendix D). Response options were: *Never, About one-fourth of the time, About half the time, About three-fourths of the time, Almost always or always, Did not apply*. Items that participants' indicated did not apply to them were coded as missing data. Bonar et al. (2011, June) found the ASH-Past to have internal consistency reliability of .87 and a mean inter-item correlation of .26. These authors also reported several aspects of criterion validity. Specifically, the ARS-Past was negatively correlated with Alcohol Use Disorders Identification Test (r = -.44), Short-Rutgers Alcohol Problem Index (r = -.33), average number of drinking days per week (r = -.35), and perceived difficulty with abstaining from alcohol during the next month (r = -.39). There was also evidence of discriminant validity as the ARS-Past was weakly correlated with positive alcohol outcome expectancies (r = -.18), negative alcohol outcome expectancies (r = -.09), and internal health locus of control (r = .18). In the present sample, the ASH-Past had internal consistency reliability of .83 and a mean inter-item correlation of .23.

Brief Comprehensive Effects of Alcohol (B-CEOA). This 15-item questionnaire asked participants to rate their outcome expectancies (e.g., I would act sociable, I would feel dizzy, I would take risks) while imagining themselves "under the influence of alcohol" (Ham, Sherry, Stewart, Norton, & Hope, 2005; Appendix E). The B-CEOA is a shortened version of the widely used 38-item CEOA (Fromme et al., 1993). Participants indicated their level of agreement that a particular expectancy is likely to occur on a 4-point scale (*Disagree, Slightly disagree, Slightly agree, Agree)*. Although the original CEOA yielded seven subscales (Fromme et al., 1993), Ham et al. (2005) reported that the B-CEOA yielded four subscales with the following internal consistency reliability: Tension Reduction (alpha = .60), Sexuality (alpha = .60), Risk and

Aggression/Liquid Courage/Sociability (alpha = .81), and Cognitive and Behavioral Impairment/Self-Perception (alpha = .60). Furthermore, a multiple regression revealed that the four subscales accounted for 11.9% of the variance in participants' weekly alcohol consumption in a university sample, $F(4, 560) = 18.87$, $p < .001$, which suggests that the B-CEOA expectancy scales have criterion validity. Internal consistency reliabilities for the B-CEOA subscales in the present study were .80 for the Risk and Aggression/Liquid Courage/Sociability subscale (mean inter-item correlation = .39), .58 for the Cognitive Behavioral Impairment/Self-Perception subscale (mean inter-item correlation = .26), .57 for the Sexuality subscale (mean inter-item correlation = .30), and .78 for the Tension Reduction subscale (mean inter-item correlation = .64).

The B-CEOA also asks respondents to rate their valuation of each expectancy outcome (i.e., "how good or bad would it be to...") on a 5-point scale (*Good, Somewhat good, Neutral, Somewhat bad, Bad*). Ham et al. (2005) reported that valuation scores yielded three subscales with the following internal consistency reliability: Cognitive and Behavioral Impairment (alpha = .61), Tension Reduction/Sociability/Sexuality (alpha = .81), and Liquid Courage/Risk and Aggression/Self-Perception (alpha = .72). Two items were excluded from these authors' subscales (i.e., moody, guilty) because their factor loadings did not exceed .40. A multiple regression revealed that the three subscales accounted for 7.7% of the variance in participants' weekly alcohol consumption in a university sample, $F(3, 533) = 14.90$, $p < .001$, which suggests that the B-CEOA valuation scales have criterion validity. Internal consistency reliabilities for the valuation subscales in the present study were .83 for the Tension Reduction/Sociability/Sexuality subscale (mean inter-item correlation = .46), .78 for the Liquid

Courage/Risk and Aggression/Self-Perception subscale (mean inter-item correlation = .46), and .67 for the Cognitive Behavioral Impairment subscale (mean inter-item correlation = .41).

Alcohol Outcome Perceived Susceptibility and Severity (AOPSS). This measure was designed for the present study to assess perceived severity of and susceptibility to eight negative consequences resulting from alcohol use (Appendix F). I based items on several outcomes from the Cognitive and Behavioral Impairment subscale (i.e., "blacking out" and missing work or class) and Risk and Aggression subscale (i.e., engaging in risky sexual activity) assessed by the Comprehensive Effects of Alcohol Questionnaire (Fromme et al., 1993). Additional items were chosen based on physical outcomes (i.e., experiencing alcohol poisoning, being physically injured, experiencing a "hang over") and psychological outcomes (i.e., experiencing sadness and experiencing anger) that occur with college student drinkers (e.g., Ham & Hope, 2003; Courtney & Polich, 2009). Each of the eight outcomes was operationally defined for participants and the definition of alcohol poisoning was based on Ziegler et al. (2005).

Susceptibility Scale. To assess perceived susceptibility, participants were asked to "estimate how likely it is that – sometime in the future – you will…" experience each of the above eight negative outcomes. Responses were provided four response choices (*Very unlikely, Somewhat unlikely, Somewhat likely, Very likely*). To evaluate the relationships among susceptibility scale items, I conducted a factor analysis with principal components extraction (oblique rotation). Analyses yielded two factors with eigenvalues over 1.0, with the first 2-item factor accounting for 36% of total variance (eigenvalue of 2.9) and the second 2-item factor accounting for 13% of total variance (eigenvalue of 1.02). Four items cross-loaded on both factors (i.e., scores above .40). Internal consistency reliability across all eight items was .73 and the mean inter-item correlation was .26. Based on how little variance was accounted for by the

second factor, the large number of cross-loadings, and the good internal consistency reliability score across all items, I believed that these items most accurately represented a single component. Therefore, I averaged the eight items in order to gather a mean susceptibility scale score for later analyses.

Severity Scale. To assess perceived severity, participants were asked, "how serious would it be if you…" experienced each of the eight negative outcomes as a result of drinking. Participants were asked to rate perceived severity on the following scale: *Not serious*, *Slightly serious, Moderately serious, Very serious, Extremely serious*. I conducted a factor analysis with principal components extraction (oblique rotation) using participants' responses on the severity scale. Analyses yielded two factors with eigenvalues over 1.0, with the first 3-item scale accounting for 40% of total variance (eigenvalue of 3.2) and the second 3-item scale accounting for 15% of total variance (eigenvalue of 1.2). Two items cross-loaded on both factors (i.e., scores above .40). Internal consistency reliability across all eight items was .78 and the mean inter-item correlation was .31. Based on how little variance was accounted for by the second factor, two items that had cross-loadings, and the good internal consistency reliability score across all items, I believed that these items most accurately represented a single component. Therefore, I averaged the eight items in order to gather a mean severity scale score.

AOPSS Value Scale. Participants were also asked to rate "How good or bad would it be if you…" experienced each of the eight listed outcomes. Response options were: *Bad, Somewhat bad, Neutral, Somewhat good, Good*. To evaluate the relationship among the outcome value scale items, I conducted a factor analysis with principal components extraction (oblique rotation) using participants' responses on the valuation scale. Analyses yielded one 8-item factor with an eigenvalue of 3.5 which accounted for 43% of total variance. Internal consistency reliability

across all eight items on the valuation scale was .80 and the mean inter-item correlation was .35. I averaged the eight items in order to gather a mean valuation scale score for perceived drinking outcomes.

AOPSS Consequence Scale. Lastly, participants were asked if they had ever experienced each negative outcome and the number of times they had experienced each outcome in the past year. I conducted a factor analysis with principal components extraction (oblique rotation) using participants' responses on the severity scale. Analyses yielded two factors with eigenvalues over 1.0, with the first 6-item factor accounting for 36% of total variance (eigenvalue of 2.9) and the second 2-item factor accounting for 18% of total variance (eigenvalue of 1.4). Because the second factor accounted for little overall variance and was only two items, I believed that the eight items best represented a single component. Based on Hurlbut and Sher (1992), I calculated three drinking outcome scores (lifetime occurrence of unique outcomes, past-year occurrence of unique outcomes, and the frequency of occurrence for each past-year outcome). In the present sample, internal consistency reliabilities were .64 for the lifetime occurrence scale (mean inter-item correlation was .18), .63 for the past year occurrence scale (mean inter-item correlation was .16), and .75 for the frequency of occurrence for each past-year outcome (mean inter-item correlation was .25).

Perceived Benefits and Barriers of Harm Reduction (PBB-HR). I assessed perceived benefits of and barriers to engaging in harm reduction using open-ended questions similar to previous research that asked about advantages and disadvantages of select harm reduction strategies (e.g., Phillips, Rosenberg, & Sanikop, 2007). Specifically, participants were asked to choose one harm reduction strategy that "you have not used in the past, but that you may use in the future" and to list two benefits of using (i.e., "good things that may come from…") and two

barriers to using (i.e., "things that may get in the way of…") each of these strategies to reduce drinking-related negative outcomes (see Appendix G).

Value on Health Scale (VHS). I used the 5-item Value on Health Scale to assess the degree to which participants value their personal health (Costa, Jessor, & Donovan, 1989; Appendix H). The VHS includes questions asking the value of being in good physical condition, having a sense of vigor, having endurance, maintaining an appropriate weight, and resisting illness. Items were prefaced by "How important is it to you..." and rated on a 4-point scale (*Not important at all, Somewhat important, Important, Very important*). Costa et al. (1989) reported that this measure is internally consistent (alpha = .77) with a mean inter-item correlation of .40. These authors also suggested that the Value on Health Scale has convergent validity, supported by positive correlations with a variety of health-related psychosocial measures (e.g., assessing self-reported health status, use of exercise, and health-enhancing behaviors; *r*s ranged from .33 to .53), and discriminant validity, supported by low correlations with internal health locus of control (r = .27) and external health locus of control (r = -.13). Internal consistency reliability for the VHS in the present study was .88 and the mean inter-item correlation was .60.

Young Adult Alcohol Problems Screening Test (YAAPST). I used the 27-item YAAPST to assess participants' negative consequences resulting from drinking, and symptoms of alcohol abuse and dependence (Hurlbut & Sher, 1992; Appendix I). The YAAPST assesses drinking outcomes that are applicable to both college students (e.g., missing class, getting expelled from school) and any drinker (e.g., driving while intoxicated, experiencing hangovers). Responses to the YAAPST yield three different scores: occurrence of lifetime problems, past-year problems, and severity (i.e., number of occurrences) of these problems. The severity scale will be called the frequency scale in further discussion. Hurlbut and Sher (1992) reported that

the YAAPST had internal consistency alpha coefficients of .87 for lifetime, .83 for past year, and .84 for past-year frequency scores. Nine month test-retest reliability was .85 for lifetime consequences, .73 for past year consequences, and .78 for past-year frequency of consequences. These authors also reported concurrent validity indicated by significant positive correlations with the Short Michigan Alcohol Screening Test, past month and past year quantity and frequency of drinking, and heavy drinking composite scores (*r*s range from .43 to .65). Furthermore, Hurlbut and Sher (1992) argued that the YAAPST had criterion validity because the measure's subscales accounted for substantial amounts of the variance in Diagnostic Interview Schedule/Diagnostic and Statistical Manual-III alcohol diagnoses: 42% (lifetime), 33% (past year), and 34% (past-year frequency). The YAAPST was also correlated with various personality, expectancy, and motivational variables related to drinking (*r*s range from .30 to .61). Internal consistency reliabilities for the present study were .87 for lifetime, .86 for past-year, .89 for past-year frequency. Mean inter-item correlations were .23 for lifetime, .23 for past-year, and .28 for past-year frequency.

College Alcohol Problems Scale-revised (CAPS-r). I used the 8-item version (Maddock, Laforge, Rossi, & O'Hare, 2001; Appendix J) of the original 10-item version of the CAPS (O'Hare, 1997) to assess drinking-related negative consequences for college students. Participants were asked how often they have encountered specific problems (e.g., did not use protection when engaging in sex, had problems with appetite or sleeping) over the last year as a result of drinking. Items were rated on a 5-point scale (1 = *Never/Almost never*, 2 = *Rarely,* 3 = *Sometimes/Occasionally,* 4 = *Often,* 5 = *Very often*). The CAPS-r is comprised of two subscales: Social Problems and Personal Problems. Maddock et al. (2001) reported that internal consistency of the CAPS-r was .79 for the personal problem subscale and .75 for the social

problems subscale. The authors reported that this measure was positively correlated with various alcohol consumption variables, stages of change, temptations to drink, Greek membership, YAAPST scores, and pros/cons of drinking (*r*s range from .42 to .78). The CAPS-r was correlated .94 with the original CAPS. In the present sample, internal consistency reliability for the Social Problems subscale was .59 and the mean inter-item correlation was .27. Internal consistency reliability for the Personal Problem subscale in the present study was .84 and the mean inter-item correlation was .57.

Demographics and Drinking History Questionnaire. This measure was adapted for the present study based on previous demographic measures (e.g., Bonar et al., 2011; Rosenberg et al., in press) to assess participant's background information (e.g., age, gender, year in school, employment status, grade point average) and drinking history (e.g., typical number of drinking days per week, number of binge episodes in the past four weeks, typical number of beverages consumed when drinking; Appendix K).

Summary of Hypotheses

1. Greater perceived severity of negative alcohol outcomes will be associated with past use of harm reduction strategies.
2. Greater perceived susceptibility to negative alcohol outcomes will be associated with past use of harm reduction strategies.
3. Health value will mediate the relationship between perceived severity and susceptibility and past use of alcohol harm reduction strategies.
4. Greater agreement with alcohol expectancies will not be related to use of harm reduction strategies.

5. Stronger ratings of negative valuation of alcohol outcomes will be related to more frequent use of harm reduction strategies.
6. Stronger ratings of positive valuation of alcohol outcomes will be related to less frequent use of harm reduction strategies.
7. Women will have engaged in alcohol harm reduction strategies more often than men.
8. Less frequent binge drinkers will have engaged in alcohol harm reduction strategies more often than frequent binge drinkers.
9. Drinkers who report more alcohol-related problems will have engaged in harm reduction strategies less frequently than drinkers with fewer alcohol-related problems.

RESULTS

Preliminary Analyses

Participants' Demographic Information. The final sample comprised 585 undergraduate students enrolled at Bowling Green State University. The majority of the participants were female (58%) and identified themselves as White/European American (90%), which reflects the demographics of the university. The mean age of participants was 20.0 years (*SD* = 2.2), and most participants were enrolled in their first year of college (49%). There was variability in self-reported grade point average (GPA), with 25% of participants reporting a GPA between 3.5 and 4.0, 30% reporting a GPA between 3.0 and 3.49, and 41% reporting a GPA between 2.0 and 2.99. The majority of participants lived on campus (62%) and 45% held a part-time job in addition to attending school. Table 1 displays additional information about participants' background characteristics.

Participants' Alcohol Use and Drinking-Related Consequences. Participants' mean age of their first drink of alcohol was 15.8 years (*SD* = 2.5). Ninety-two percent reported having been "drunk" at least once in their lifetime; the first time, on average, was between 16 and 17 years old (*M* = 16.7, *SD* = 1.9). The majority of participants also reported being "drunk" in the previous four weeks (75%). On average, participants reported drinking 1.5 (*SD* = 1.2) days in a typical week, and consuming 6.1 (*SD* = 3.6) alcoholic beverages on a typical drinking day. Just over half of participants reported typically consuming a combination of beer, liquor, and/or wine when they drank. During the previous four weeks, participants reported binge drinking (i.e., consuming 4+ drinks if female or 5+ drinks if male) on average 3.9 (*SD* = 4.6) times. Most participants felt their drinking was completely under their control (75%) and that it would be

very easy to abstain from drinking over the next month (66%). Table 2 displays additional information about participants' alcohol use history.

Participants also answered questions about outcomes they had experienced related to drinking. Participants reported that on average, they had "rarely" experienced the eight specific drinking-related consequences listed on the CAPS-r (M = 1.9, SD = .8 for the Personal Problems subscale; M = 1.7, SD = 0.7 for the Social Problems subscale). On the 27-item YAAPST, participants reported experiencing an average of 7.5 (SD = 4.9) different drinking outcomes in their lifetime and, within the previous year, 6.0 (SD = 4.5) different outcomes. There was variability in type of outcomes reported by participants during the previous year, with 79% experiencing a "hangover" but only 2% having been arrested for drunk driving and another 2% having been fired from a job or expelled or suspended from school. Participants also indicated that some consequences occurred frequently during the previous year. For example, when participants were asked the number of hangovers they had experienced in the past year, 36% reported one to three, 15% reported four to six, 13% reported seven to 11, 10% reported 12 to 20, and 6% reported over 21. On the eight-item AOPSS, participants reported that they had experienced an average of 3.6 (SD = 1.8) different drinking outcomes over their lifetime and that 3.0 (SD = 1.8) of these outcomes had occurred during the past year. Table 3 lists the percentage of participants who experienced each YAAPST and AOPSS drinking consequence during the past-year. Table 4 lists how frequently each of the AOPSS outcomes occurred during the previous year.

Participants' Drinking Expectations, Expectancy-Values, and Health Beliefs. On a questionnaire asking the degree to which they expected 15 different outcomes to occur when they drank alcohol, participants indicated slight agreement with the expectancy that drinking

increases sociability, courage, and risk and aggression (M = 3.1, SD = 0.6; possible range = 1 to 4). When asked whether or not they expected drinking to reduce tension, participants' total mean score was 2.5 (SD = 0.9) which fell between slight agreement and slight disagreement overall. Specifically, approximately 38% of the sample disagreed or disagreed slightly that alcohol reduces tension, 14% of the sample's total mean scores fell between slight disagreement and slight agreement, and 48% of the sample agreed or agreed slightly that alcohol reduces tension. Similarly, when asked whether participants expected drinking to impair cognition and behavior and impact self-perception, their total mean score was 2.5 (SD = 0.6), falling between slight agreement and slight disagreement. Specifically, approximately 31% of the sample disagreed or disagreed slightly that alcohol impairs cognition and behavior and affects self-perception, 45% of the sample's total mean scores fell between slight disagreement and slight agreement, and 23% agreed or agreed slightly that alcohol impairs cognition and behavior and impacts self-perception. Lastly, participants reported that they disagreed slightly with the expectancy that drinking enhances sexuality (M = 2.2, SD = 0.7).

In addition, respondents rated how good or bad it would be to experience each of these outcomes, unrelated to drinking alcohol. Participants reported that it would be somewhat bad to have their cognition or behavior impaired (M = 2.1, SD = 0.8; possible range = 1 to 5), and that they were neutral about being more courageous and aggressive, taking more risks, and altering their self-perception (M = 3.2, SD = 0.8). However, participants indicated that it would be good to increase sociability and sexuality and to reduce tension (M = 4.4, SD = 0.7).

Participants were also asked to rate how much they valued five aspects of their health, and to rate the severity of, their valuation of, and their susceptibility to eight different drinking consequences. On the Value on Health Scale, participants indicated that they believed their

health was important (*M* = 3.2, *SD* = 0.6; possible range = 1 to 4). Respondents indicated that, overall, the eight drinking consequences were between moderately serious and very serious (*M* = 3.5, *SD* = 0.7; possible range = 1 to 5) and it would be bad if they experienced them (*M* = 4.3, *SD* = 0.5; possible range = 1 to 5). Participants also reported that they had a somewhat unlikely chance of experiencing these drinking consequences in the future (*M* = 1.8, *SD* = 0.5; possible range = 1 to 4).

Participants' Recent Use of Alcohol-Reduction Strategies. As examination of Table 5 reveals, participants reported that, overall, they had used the 31 ARS-Past strategies – designed to reduce the frequency or quantity of their drinking – between one-fourth and one-half of the times they drank during the previous four weeks (*M* = 2.6, *SD* = 0.7; response options: 1 = *Never,* 2 = *About one-fourth of the time,* 3 = *About half the time,* 4 = *About three-fourths of the time,* 5 = *Almost always or always*). Participants indicated that they had used the following ARS-Past strategies the most frequently (between half and three-fourths of the time) when drinking during the previous four weeks: eating a meal prior to drinking (*M* = 4.1, *SD* = 1.1), avoiding starting a new drink before finishing the one they had (*M* = 4.0, *SD* = 1.4), avoiding drinking out of oversized containers (*M* = 3.7, *SD* = 1.6), saying "no" to drink offers they did not want (*M* = 3.7, *SD* = 1.4), and bringing a limited amount of spending money with them (*M* = 3.6, *SD* = 1.5). Alcohol-reduction strategies that were used the least frequently during the previous four weeks (mean score below two indicating less than one-fourth of the times) included accepting a drink offer and setting it aside (*M* = 2.0, *SD* = 1.2), putting extra ice in their drink (*M* = 1.8, *SD* = 1.3), waiting at least 20 minutes past the time they would normally start drinking (*M* = 1.8, *SD* = 1.1), staying away from the refrigerator, keg, or bartender where alcohol was easily accessible (*M* = 1.8, *SD* = 1.2), asking the person making their drinks to make them weak (*M* =

1.8, *SD* = 1.2), having a non-alcoholic drink between each alcoholic drink (*M* = 1.7, *SD* = 1.1), ordering a non-alcoholic drink that could pass as an alcoholic drink (*M* = 1.5, *SD* = 1.0), and keeping track of drinks on their cell phone or a piece of paper (*M* = 1.2, *SD* = 0.7).

Because not every alcohol-reduction strategy was relevant for the contexts in which each participant drank, I included "did not apply" as a response option when asking about one's past use of strategies. There were 14 ARS-Past strategies that were rated as not applicable by more than 10% of respondents. These strategies included: avoiding drinking in rounds (22%), waiting at least 20 minutes past the normal start time for drinking (20%), bringing a limited amount of spending money (16%), not drinking out of oversized containers (14%), accepting a drink offer and then not drinking it (14%), using a single shot glass to measure hard liquor in their drink (14%), ordering a non-alcoholic drink that looks like an alcoholic drink (13%), limiting the amount of alcohol someone else puts in their drink (13%), asking the person making their drink to make it weak (13%), putting extra ice in their drink (13%), not eating salty foods when drinking (12%), not adding more alcohol to an unfinished drink (11%), and putting extra non-alcoholic mixer in their drink (11%).

Participants' Recent Use of Alcohol-Safety-and-Health Strategies. As examination of Table 6 indicates, participants reported more frequent use of alcohol-safety-and-health strategies. Specifically, they had used the 17 ASH-Past strategies – aimed at increasing the health and safety during and after their alcohol use – between three-fourths of the times and almost-all-or-all of the times that they drank alcohol during the previous four weeks (*M* = 4.3, *SD* = 0.6; possible range = 1 to 5). Participants indicated that the ASH-Past strategies they used most frequently (mean score above 4.5) when drinking during the previous four weeks were: carrying a cell phone with them (*M* = 4.9, *SD* = 0.5), finding a safe way to get elsewhere (*M* = 4.6, *SD* =

0.9), staying close by a trusted friend (M = 4.6, SD = 0.8), and avoiding carrying a weapon (M = 4.5, SD = 1.2). Alcohol-safety-and-health strategies that were used less frequently during the previous four weeks (mean score below four indicating less than three-fourths of the times) included using a condom during sex (M = 3.9, SD = 1.5), avoiding dehydration (M = 3.7, SD = 1.3), and carrying emergency cash (M = 3.5, SD = 1.6).

There were seven ASH-Past strategies that were rated as not applicable by more than 10% of participants. These strategies were: using a condom (40%), not swimming or using a hot tub (38%), not carrying a weapon (28%), not taking recreational drugs (19%), walking away from arguments or conflicts with others (17%), letting friends know where they were going if they decided to leave (16%), and avoiding consuming drinks offered by people they did not know or trust (14%).

Predictor Variables for Inclusion in Primary Analyses

Demographics, Alcohol Use, and Drinking Outcomes. Based on previous research that found women use strategies more often than men, and because younger drinkers have less drinking experience than older drinkers, I included gender and age in the multiple regressions to assess past use of harm reduction strategies. Because age was significantly and highly correlated with participants' year in college (r = .88, p < .001), I did not include year in college in regression analyses. I did not have an empirical, theoretical, or clinical basis to include grade point average, employment status, living situation, or college major in these regressions. There was not enough variability in my sample to include ethnicity (90% of participants reported their ethnicity as White or European American) or school status (98% of respondents stated they were full-time students).

I included participants' binge status as the drinking variable in the multiple regressions. Because past month binge drinking was significantly correlated with the number of days participants typically drank per week ($r = .62$, $p < .001$), and the number of drinks participants consumed on a typical drinking day ($r = .55$, $p < .001$), I excluded these two latter variables from the regression analyses. There was little variability in whether participants felt their drinking was under their control (75% of participants reported their drinking was "completely" under their control), how difficult it would be to abstain from alcohol for the next month (66% stated it would be "very easy" and another 22% said it would be "somewhat easy"), past month intoxication (75% reported they had been "drunk" in the past four weeks), and the percentage of their friends who drink alcohol (82% of participants reported that three-quarters or more of their friends drink). I did not have an empirical, theoretical, or clinical basis to include age of first drink or age of first intoxication into the regressions.

I included the YAAPST frequency scale and the CAPS-r Personal Problems subscale as drinking outcome variables in the multiple regressions. The CAPS-r Social Problems subscale was excluded from the regressions because of low scale reliability (Cronbach's alpha = .59) and redundancy with YAAPST items. The three YAAPST scales (lifetime problems, past-year problems, frequency of past-year problems) were highly positively correlated (*rs* range from .86 to .94, all *p*s < .001); rather than include all three as predictors, I chose to include the frequency subscale because it reflects both the number of different outcomes experienced by the participant and the frequency of each of these outcomes during the past year. The AOPSS outcome scales were excluded from the regression because of low scale reliabilities (alphas ranged from .63 to .75) compared to the YAAPST scales and CAPS-r Personal Problems subscale, because many of the AOPSS's eight items were included in the YAAPST scales and CAPS-r Personal Problems

subscale, and because the AOPSS was designed for this project whereas the YAAPST and CAPS-r are established research measures.

Alcohol Expectancies, Expectancy-Values, and Health Beliefs. Given the low correlations among all of the expectancy, expectancy-value and health belief variables (i.e., all but one correlation was less than .48), I included all four subscales from the B-CEOA, all three subscales from the B-CEOA Value scale, the three AOPSS scales (i.e., Severity, Susceptibility, Value), and the VHS, as predictor variables in the multiple regressions. Although the AOPSS severity scale and the AOPSS value scale were moderately correlated (r = .67), I included both because each of these constructs reflected a unique aspect of the Health Belief Model.

Lastly, my examination of scatterplots showed that there were no obvious curvilinear relationships between any predictor and either of the two outcome variables. Table 7 lists correlations between predictor and outcome variables (excluding demographic variables) that were included in primary analyses. Concerning demographic variables, correlations between age and other predictor variables ranged from -.14 to .11, while gender was correlated with other predictor variables from -.19 to .19. Age was significantly correlated with alcohol-reduction strategies (r = .11) but not alcohol-safety-and-health strategies (r = .07). Gender was significantly correlated with both alcohol-reduction strategies (r = .14) and alcohol-safety-and-health strategies (r = .18).

Primary Analyses

Predicting Recent Use of Alcohol Harm Reduction Strategies. I conducted two hierarchical multiple regressions to assess whether demographic and drinking variables, drinking expectancies and expectancy-values, and Health Belief Model factors predicted engagement in alcohol-reduction strategies (ARS-Past) and safety-and-health strategies (ASH-Past). I chose a

two block regression model because I wanted to assess the contribution of alcohol expectancies, expectancy-values, and health belief variables separately from demographic and drinking history variables that have been related to use of harm reduction strategies in prior research. Therefore, block one included age, gender, binge status, and drinking-related problems (measured using YAAPST Frequency scale and CAPS-r Personal Problems subscale). Block two comprised all expectancy-outcome subscales (four B-CEOA subscales), expectancy-value subscales (three B-CEOA – Value subscales), perceived susceptibility to outcomes (AOPSS – Susceptibility), perceived severity of outcomes (AOPSS – Severity), valuation of health outcomes (AOPSS – Value), and general health value (VHS).

Predicting Recent Use of Alcohol-Reduction Strategies (ARS-Past). As examination of Table 8 reveals, block one of this hierarchical multiple regression was significant, $F(5,570) = 24.35$, $p < .001$, Adj. $R^2 = .17$. The statistically significant predictors included binge status ($\beta = -.22$), frequency of past-year drinking-related outcomes on the YAAPST ($\beta = -.22$), and gender ($\beta = .09$). In support of my hypotheses, participants' recent use of alcohol-reduction strategies was related to experiencing fewer recent binge drinking episodes, experiencing fewer drinking-related negative outcomes during the previous year, and being female.

I next examined the full model which included all predictor variables to assess past month use of alcohol-reduction strategies. As Table 8 also reveals, the full model was significant, $F(16,559) = 17.85$, $p < .001$, Adj. $R^2 = .32$. Specifically, AOPSS severity scale ($\beta = .24$), BCEOA Risk and Aggression/Liquid Courage/Sociability subscale ($\beta = -.23$), binge status ($\beta = -.15$), and BCEOA-Value Cognitive Behavioral Impairment subscale ($\beta = -.14$) were significantly associated with use of drinking reduction strategies. These results supported my hypotheses that the more frequently one engaged in alcohol-reduction strategies within the past

four weeks, the more one rated drinking-related health outcomes as severe, the less frequently one binge drank, and the more one evaluated cognitive and behavioral impairment as negative. Contrary to what I expected, I found that using strategies more frequently was related to one's expectations that drinking would result in taking fewer risks and being less aggressive, courageous, and sociable. In contrast to block one results, gender and frequency of past-year drinking outcomes were no longer significant in the full model when taking into account alcohol expectancies, expectancy-values, and health beliefs.

Predicting Recent Use of Safety-and-Health Strategies (ASH-Past). As examination of Table 9 reveals, the regression assessing the amount of variance in recent use of alcohol-safety-and-health strategies accounted for by demographic and drinking history variables was significant, $F(5,569) = 31.95$, $p < .001$, Adj. $R^2 = .21$. Significant predictors included frequency of past-year drinking-related outcomes on the YAAPST ($\beta = -.43$) and gender ($\beta = .14$). In support of my hypotheses, participants' recent use of alcohol-safety-and-health strategies was related to experiencing fewer drinking-related negative outcomes during the previous year and to being female.

When including all predictor variables, the full model assessing use of alcohol-safety-and-health strategies over the previous four weeks was also significant, $F(16,558) = 13.00$, $p < .001$, Adj. $R^2 = .25$. As Table 9 shows, significant predictors included frequency of past-year drinking-related outcomes on the YAAPST ($\beta = -.34$), AOPSS severity scale ($\beta = .14$), B-CEOA Value Tension Reduction/Sociability/Sexuality subscale ($\beta = .13$), gender ($\beta = .11$), and B-CEOA Value Liquid Courage/Risk and Aggression/Self-Perception subscale ($\beta = -.10$). These results supported my hypotheses that more frequent recent use of alcohol-safety-and-health strategies was related to experiencing alcohol-related outcomes less frequently, viewing drinking-related

outcomes as more severe, and to being female. Contrary to my hypotheses, the more frequently these students had used alcohol-safety-and-health strategies, the more they valued reduced tension, increased sociability and enhanced sexuality. In addition, students who had used alcohol-safety-and-health strategies more frequently rated being more courageous and aggressive, taking risks, and self-perception as less important.

Predicting Recent Use of Alcohol Harm Reduction Strategies with a Modified Sample. I wanted to assess whether the findings of the regression analyses differed when I excluded those participants who reported that more than 10% of the alcohol-reduction and alcohol-safety-and-health strategies were not applicable to them. Therefore, I conducted two additional hierarchical multiple regressions to assess predictors of recent use of strategies that participants either had used or could potentially use while drinking. Specifically, these regressions excluded the subset of participants who reported that more than 10% of the alcohol-reduction or alcohol-safety-and-health strategies were not applicable to them (i.e., more than three ARS-Past items or two ASH-Past items). A total of 331 participants were included in these analyses.

Predicting Use of Alcohol-Reduction Strategies with a Modified Sample. I examined block one of the modified sample to assess the amount of variance accounted for by demographic and drinking history variables when predicting use of alcohol-reduction strategies. This block was significant, $F(5,321) = 15.52$, $p < .001$, Adj. $R^2 = .18$, and significant predictors included binge status ($\beta = -.27$), gender ($\beta = .16$), frequency of past-year drinking-related outcomes on the YAAPST ($\beta = -.14$), and age ($\beta = .11$). This pattern of findings is similar to that of the full sample, except that in the modified sample, being an older student was related to more frequent recent use of alcohol-reduction strategies.

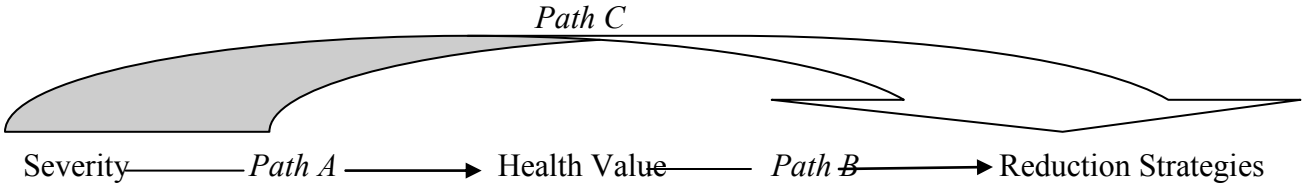
The full model predicting past month use of alcohol-reduction strategies with the modified sample was also significant, $F(16,310) = 9.97$, $p < .001$, Adj. $R^2 = .31$. Significant predictors included the AOPSS severity scale ($\beta = .31$), BCEOA Risk and Aggression/Liquid Courage/Sociability subscale ($\beta = -.19$), binge status ($\beta = -.17$), BCEOA-Value Cognitive Behavioral Impairment subscale ($\beta = -.16$), and age ($\beta = .11$). Most of the same predictors were significant in this analysis of the modified sample. The only exception was age, which was significantly associated with use of alcohol-reduction strategies in the modified sample, but not in the full sample.

Predicting Use of Alcohol-Safety-and-Health Strategies with a Modified Sample. Next, I looked at block one of the modified sample regression to assess the amount of variance accounted for by demographic and drinking history variables when predicting use of alcohol-safety-and-health strategies. The first block was significant, $F(5,321) = 16.48$, $p < .05$, Adj. $R^2 = .19$, and significant predictors included frequency of past-year drinking-related outcomes on the YAAPST ($\beta = -.39$) and gender ($\beta = .18$). The same predictors were significant in the regression analysis conducted with the full sample.

The full model predicting past four week use of alcohol-safety-and-health strategies with the modified sample was also significant, $F(16,310) = 6.87$, $p < .001$, Adj. $R^2 = .22$. Significant predictors included frequency of past-year drinking-related outcomes on the YAAPST ($\beta = -.30$), B-CEOA Value Tension Reduction/Sociability/Sexuality subscale ($\beta = .15$), B-CEOA Value Liquid Courage/Risk and Aggression/Self-Perception subscale ($\beta = -.15$), AOPSS severity scale ($\beta = .15$), and gender ($\beta = .14$). The same predictors were significant in the regression analysis conducted with the full sample.

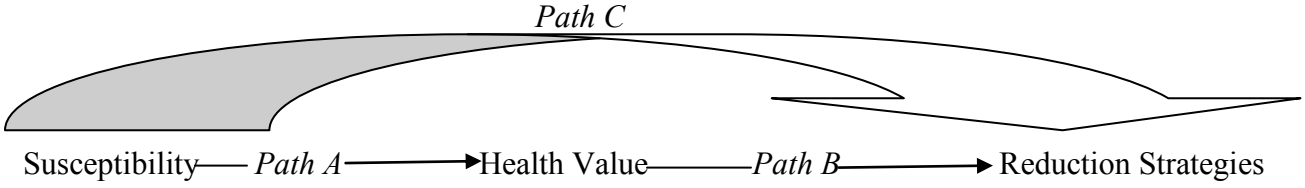
Health Value as a Mediator Between Perceived Severity and Susceptibility and Harm Reduction. I conducted four path analyses using linear regressions, as recommended by Frazier, Tix, and Barron (2004), to assess whether participants' general health values mediated the relationship between recent use of alcohol harm reduction strategies and both perceived susceptibility to and perceived severity of drinking outcomes.

Path 1: Severity, Health Value, and Alcohol-Reduction Strategies. The first path I tested included perceived severity (AOPSS) as the predictor variable, health value (HVS) as the mediator variable and recent past use of alcohol-reduction strategies (ARS-Past) as the outcome variable.



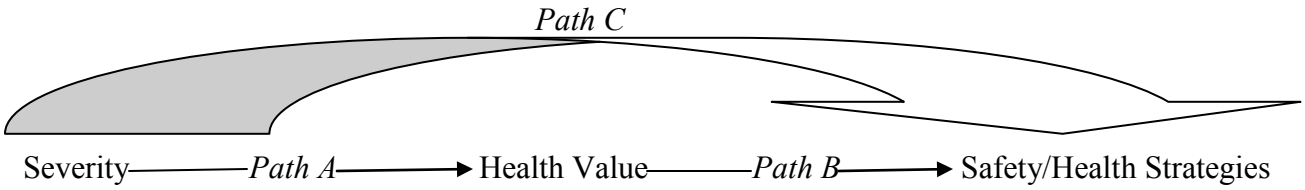
In the first test of this model, I established that Path C was significant and that perceived severity of outcomes was significantly related to past use of alcohol-reduction strategies (β =.36, p < .001). During the second test (Path A), perceived severity of outcomes was not significantly related to health value (β =.07, p = .08). Therefore, I did not test the final pathway and concluded that the mediation model was not met.

Path 2: Susceptibility, Health Value, and Alcohol-Reduction Strategies. In the second path I tested, perceived susceptibility (AOPSS) was the predictor variable and health value and alcohol-reduction strategies served as the mediator and outcome variables, respectively.



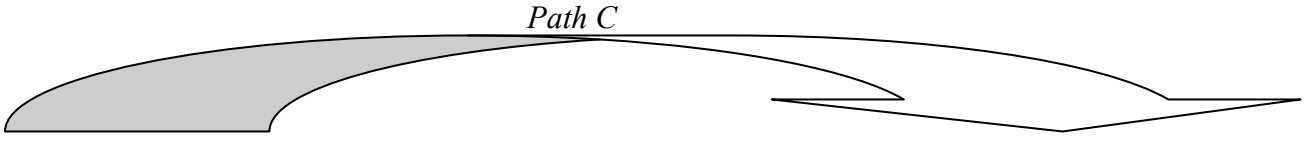
Perceived susceptibility to outcomes was significantly related to recent use of alcohol-reduction strategies in the first test, Path C (β = -.36, p < .001). In the second test, perceived susceptibility to outcomes was not significantly related to health value in Path A (β = .05, p = .26). Therefore, I did not continue to test the model and concluded that health value did not mediate the relationship between perceived susceptibility and use of alcohol-reduction strategies.

Path 3: Severity, Health Value, and Alcohol-Safety-and-Health Strategies. The third path I tested included perceived severity (AOPSS) as the predictor variable, health value (HVS) as the mediator variable and recent use of alcohol-safety-and-health strategies (ASH-Past) as the outcome variable.



In the first test of this model (Path C), perceived severity of outcomes was significantly related to past use of alcohol-safety-and-health strategies (β = .32, p < .001). In path A, the relationship between perceived severity of outcomes and health value was not significant in the second test (β = .07, p = .08). Therefore, I did not test the final pathway and concluded that health value did not mediate the relationship between perceived severity of outcomes and recent use of alcohol-safety-and-health strategies.

Path 4: Susceptibility, Health Value, and Alcohol-Safety-and-Health Strategies. In the fourth path I tested, perceived susceptibility (AOPSS) was the predictor variable and health value and alcohol-safety-and-health strategies served as the mediator and outcome variables, respectively.



Susceptibility—— *Path A*——→ Health Value——*Path B*——→ Safety/Health Strategies

Perceived susceptibility to outcomes was significantly related to recent use of alcohol-safety-and-health strategies in the first test, Path C (β = -.31, p < .001). In the second test, Path A, perceived susceptibility to negative outcomes was not significantly related to health value (β = .05, p = .26). Therefore, I did not continue to test the current model and concluded that health value did not mediate the relationship between susceptibility to outcomes and recent use of alcohol-safety-and-health strategies.

Supplementary Analyses

Participants' Demographics, Alcohol Use, and Drinking Outcomes. Though I did not establish a priori hypotheses regarding the relationship between participants' alcohol use history and drinking-related outcomes, I calculated Pearson correlations to assess the relationship among these variables. Results revealed that being drunk in the previous month and the number of binge episodes a participant experienced in the past four weeks were significantly positively correlated (all ps < .001) with feeling that drinking was not under control (drunk r = .17, binge r = .19), difficulty with abstaining over the next month (drunk r = .27, binge r = .47), the number of participants' friends who drink alcohol(drunk r = .23, binge r = .28), lifetime occurrence (drunk r = .35, binge r = .45) and past-year occurrence (drunk r = .37, binge r = .49) of drinking-related problems, and the frequency of past-year problems (drunk r = .38, binge r = .57). In addition, average number of drinks consumed and typical number of drinking days per week were significantly positively correlated (all ps < .001) with feeling that drinking was not under one's control (drinks r = .18, days r = .22), anticipated difficulty with abstaining over the next month (drinks r = .32, days r = .47), the number of participants' friends who drink alcohol

(drinks r = .33, days r = .31), lifetime occurrence of drinking-related problems (drinks r = .38, days r = .49), past-year occurrence of drinking-related problems (drinks r = .43, days r = .49), and the frequency of past-year drinking problems (drinks r = .47, days r = .54).

I next assessed the relationship between participants' demographic information and their alcohol use history and drinking related-outcomes using a series of one-way analysis of variance tests while controlling for type one error (adjusted p = .006). This test revealed that participants' year in school was significantly related with the number of drinking-related problems experienced during the past year, $F(3,578) = 5.17$, p = .002. Bonferroni tests showed that freshman (M = 6.6, SD = 4.6) students had significantly more problems related to their drinking during the past year compared to both junior (M = 5.1, SD = 3.4) and senior (M = 5.1, SD = 4.2) students. Participants' grade point average was significantly related with lifetime occurrence of drinking-related problems, $F(3,581) = 5.34$, p = .001, and past year occurrence of drinking-related problems, $F(3,581) = 4.63$, p = .003. Bonferroni tests revealed that participants who reported a GPA of 3.5 or higher had fewer lifetime drinking-related problems (M = 6.4, SD = 3.8) and fewer past year drinking-related problems (M = 5.1, SD = 3.5) compared to participants with a GPA between 2.0 and 2.99 (lifetime problems: M = 8.1, SD = 5.1; past-year problems: M = 6.5, SD = 4.7) and compared to those with a GPA below 2.0 (lifetime problems: M = 9.3, SD = 6.2; past-year problems: M = 7.8, SD = 5.5). Participants' living situation (i.e., on or off campus) and employment status were not significantly related to their drinking history using the adjusted alpha level.

Intention to Use Specific Harm Reduction Strategies. Participants were provided with a list of all 48 alcohol-reduction and safety-and-health strategies and asked to choose one strategy they had not used in the past, but might use in the future when drinking. Respondents

identified 41 total strategies that they would be open to using in the future. The most frequently chosen strategies were leaving at least 15 minutes in between each drink (13%), avoiding catching up if they started drinking after others (7%), having a non-alcohol drink in between each alcoholic drink (7%), eating a meal before starting drinking (7%), keeping track of each drink in their head (7%), keeping track of each drink on their cell phone or paper (6%), and setting a limit on the total number of drinks they'd consume (6%).

DISCUSSION

The present study assessed the degree to which health belief factors (i.e., susceptibility to drinking-related outcomes, severity of drinking-related outcomes, general health value), alcohol outcome expectancies and expectancy-values, drinking history (i.e., number of binges, frequency of drinking-related problems), and two background characteristics (i.e., gender, age) were associated with the frequency with which 585 college student drinkers engaged in alcohol-reduction and safety-and-health strategies when drinking. Significant hierarchical linear regressions revealed that more frequent use of alcohol-reduction strategies was associated with less frequent binge drinking, lower expectations that drinking would result in risk taking and being aggressive, courageous, and sociable, more negative evaluations of cognitive and behavioral impairment, and higher severity ratings of drinking-related outcomes. More frequent use of alcohol-safety-and-health strategies was related to being female, experiencing fewer negative drinking-related outcomes during the previous year, more positive evaluations of tension reduction, sociability, and sexuality, more negative evaluations of risk taking, self-perception, and of being more courageous and aggressive, and higher severity ratings of drinking-related outcomes.

My findings are both consistent with and expand upon previous research that assessed the factors related to undergraduate students' engagement in harm reduction strategies when drinking. For example, several investigations have suggested that health belief factors are associated with using condoms and drinking moderately (e.g., Boone & Lefkowitz, 2004; Lollis et al., 1995; Minugh et al., 1998). My findings contribute to this literature by finding that one particular health belief factor, perceived severity – averaged across individual severity ratings of eight negative drinking outcomes – predicted the frequency of recent past use of a range of alcohol-reduction strategies and alcohol-safety-and-health strategies, but perceived susceptibility

to outcomes and the degree to which one valued personal health did not. Therefore, my results suggest that Health Belief Model variables appear to be neither necessary nor sufficient to predict college students' engagement in a variety of alcohol-reduction and alcohol-safety-and-health strategies.

Because I hypothesized that the degree to which undergraduates value their personal health might account for the relationship between perceived severity of and susceptibility to outcomes and engagement in alcohol harm reduction strategies, I assessed these relationships in mediation models. My findings suggested that the degree to which students value their health does not explain the relationships between perceived severity of or susceptibility to negative outcomes and use of such strategies. However, previous research has shown that health value has moderated the relationship between health belief factors and specific health behaviors, including abstinence from drinking, improved diet, and increased exercise (Lau et al., 1986; Costa et al., 1989). Therefore, a next step for research on predicting use of strategies might be to assess whether health value moderates the relationship between severity of and susceptibility to negative outcomes and use of alcohol harm reduction strategies.

My results pertaining to alcohol expectancies were novel because no research has examined the relationship between engagement in alcohol harm reduction strategies and this construct. Specifically, I found that recent use of alcohol-reduction strategies was related to holding fewer expectations that drinking will result in taking risks and being aggressive, courageous, and sociable. However, examination of the mean scores on these variables indicated that participants expected these outcomes to occur when they were drinking. Other than this aforementioned finding, my results suggested that simply holding alcohol expectancies was not related to college students' use of alcohol-reduction or safety-and-health strategies. Instead, my results supported

the hypothesis that the valuation placed on alcohol expectancy outcomes (negative ratings of cognitive behavioral impairment and positive ratings of tension reduction, sociability, and sexuality) are associated with college students' use of harm reduction strategies when drinking. Nevertheless, one of my expectancy-value results should be interpreted with caution. Specifically, although I found a significant relationship between using alcohol-safety-and-health strategies and negative ratings of risk taking, self-perception, and being more courageous and aggressive, participants' overall mean valuation of this combination of expectancies was neutral.

My findings pertaining to gender, binge status, and drinking outcomes were consistent with prior research (e.g., Walters et al., 2007; Sugarman & Carey, 2007; Martens et al., 2007) demonstrating that being female, engaging in fewer binge episodes, and experiencing fewer negative drinking outcomes were related to more frequent use of alcohol harm reduction strategies. Specifically, I found that all of these variables, when considered in a separate block, significantly predicted use of alcohol-reduction strategies and that two of these variables – gender and alcohol-related outcomes – also predicted use of safety-and-health strategies. However, gender and alcohol-related outcomes no longer predicted use of alcohol-reduction strategies when health belief factors, alcohol expectancies, and expectancy-values were included in the full regression model. These findings suggested that health beliefs, alcohol expectancies, and expectancy-values are more robust predictors of engagement in harm reduction strategies than are students' gender and past drinking-related outcomes. However, the frequency with which students binge drink was important when predicting use of harm reduction strategies, regardless of their health beliefs and alcohol expectancies.

Limitations

Although the present study contributes to our understanding of college students' use of alcohol-related harm reduction strategies, it is not without limitations. One such limitation is that my sample, although relatively large, was recruited from just one public university in the Midwestern United States and may not be representative of the population of university students across the entire country. For example, students attending certain religiously-affiliated colleges may not drink as much or have experienced as many alcohol-related problems, and there may be a different relationship between their health-related attitudes and their use of alcohol-reduction strategies. An additional limitation was that the majority of my sample was first-year college students, aged 18 to 20. Their drinking experiences and beliefs may not be representative of older college students, especially those of legal drinking age in the United States. However, all of the participants in my sample had drunk alcohol in the past month and there were no age-related differences in drinking history and negative alcohol outcomes experienced. Additionally, the present sample was comprised primarily of Caucasian students; although Wechsler et al. (2002) reported that binge drinking is more common among white college students compared to other ethnicities, additional research is warranted to assess the predictors of use of harm reduction strategies by students from diverse ethnicities and racial backgrounds.

However, the findings of one national study suggest that my sample was representative of the larger population of university student drinkers. The National College Health Assessment, which comprised 105,781 college students from across the nation, found that approximately 51% of students who had drunk alcohol in the past month consumed 5 or fewer drinks the last time they "partied" or socialized (American College Health Association, 2011). My study found similar drinking consumption; specifically, 49% of my respondents indicated that they consume 5 or fewer alcoholic drinks during a typical drinking episode. Because I recruited college

students who had drunk alcohol in the past month, I cannot compare my sample to the national sample – which includes non-drinkers – on other drinking characteristics and outcomes.

Another feature of my sample that may impact the generalizability and internal validity of my findings was that only 133 participants stated that every strategy listed on my outcome measures (i.e., ARS-Past and ASH-Past) were applicable to them. This finding suggests that students are being selective in identifying strategies that apply to their unique drinking situations. Nevertheless, I was concerned that students who reported that many strategies were not applicable to them might have different drinking histories and beliefs compared to participants who indicated that all or almost all of the strategies were relevant when they drank. Therefore, I assessed whether students who reported that more than 10% of the strategies were not applicable to them (n = 331 in modified sample) responded similarly to the full sample. Findings showed that predictors of recent use of harm reduction were almost the same in both samples, except that older students reported more frequent use of alcohol-reduction strategies in the modified sample.

Another limitation applies to my assessment of recent use of harm reduction. Specifically, when evaluating recent use of alcohol-harm reduction strategies, I calculated a mean score across all strategies for each outcome measure. While this assesses use of a breadth of strategies, some individuals may only use one or two strategies regularly to reduce drinking-related harms. Consistent use of a couple strategies may be just as, or more, protective than implementing a breadth of strategies.

Another possible problem with my measure of alcohol-safety-and-health outcomes is that the average score across participants on the ASH-Past was high and had a small standard deviation (M = 4.3, SD = 0.6), which suggests that participants were frequently engaging in such harm reduction strategies. In addition, it is possible that the response bias on the ASH-Past

resulted in exaggerated reports of using these harm reduction strategies. Either way, the restricted range in ASH-Past scores may have attenuated the association of this variable with the predictor variables.

In addition, although the ARS-Past contains 31 and the ASH-Past contains 17 specific harm reduction strategies, there are many other useful harm reduction strategies not listed on either measure. Such idiosyncratic strategies could take into account factors including climate (e.g., "I do not drink alcohol in temperatures above 100 degrees Fahrenheit because I am more prone to heat stroke"), geographic region (e.g., "When drinking alcohol in higher altitudes, I drink slower because alcohol impacts my performance more quickly"), and emotional state (e.g., "I do not drink alcohol when I am experiencing a low mood because I am more likely to feel worse"), to name a few considerations. It may be useful in future research to ask students to list other alcohol harm reduction strategies that could or have been beneficial in their drinking experiences.

Another limitation pertains to self-report questionnaires designed for this dissertation. Specifically, I created the AOPSS because an established valid and reliable measure of health belief factors for binge drinking does not, to my knowledge, exist. An additional potential limitation was that I did not examine many psychometric properties of the AOPSS in the present study. However, one property I did assess was the factor structure of the 8-item AOPSS scales. In order to make scales that were internally consistent with homogeneity and unidimensionality, I took into consideration the percentage of variance accounted for by each factor, number of factor cross-loadings, and number of items in each factor.

Implications and Future Directions

These limitations notwithstanding, the results of the present study could be used by staff of universities, community mental health centers, counseling centers, and high schools to inform outreach efforts and intervention with young adults. Because males use strategies less frequently than do females, outreach services could focus on identifying and building motivation to use alcohol-safety-and-health strategies that are applicable to young adult men (e.g., managing negative emotions without physical aggression, increasing frequency of condom use). In addition, my results suggested that freshmen students are experiencing more alcohol-related problems than are upper-level college students. Therefore, prevention efforts could be useful with adolescents to help them prepare for entering a college drinking environment, the risks this may pose, and ways they can improve their health and safety when drinking heavily.

Assuming that the cognitive factors assessed in my study lead to increased use of alcohol harm reduction strategies, my findings also suggested that it may be beneficial to assess for specific attitudes (e.g., positive valuations of cognitive and behavioral impairment, perception of negative drinking outcomes as less severe) that are associated with less frequent engagement in harm reduction strategies. Assessment of these beliefs could help identify those who may be more likely to drink heavily or experience drinking-related problems.

The results of the present study could also be used when designing interventions with students who may be in danger of or who have experienced such problematic drinking consequences. My results suggested that students who reported more recent use of both alcohol-reduction and alcohol-safety-and-health strategies were more likely to rate drinking-related outcomes as severe. Assuming that perceiving outcomes as more severe leads to increased use of strategies, one emphasis of interventions could be on relaying accurate information on the severity (including frequency, short-, and long-term effects) of negative drinking outcomes for

college students. In addition, providing students with accurate social norms may give them a better understanding of their likelihood of experiencing such outcomes when drinking.

Another avenue of intervention could be focused on students' alcohol outcome expectancies and values. My study found that select alcohol expectancies (e.g., risk, aggression, courage, sociability) and expectancy values (e.g., tension reduction, sexuality, courage, sociability, cognitive-behavioral impairment, aggression, risk taking) were related to use of harm reduction strategies. Interventions could utilize such information when teaching and encouraging use of strategies by creating individualized harm reduction strategies that are matched with young adults' specific outcome expectancies and values. For example, if a young adult placed a high amount of importance on drinking to fit in with others, one intervention could be aimed at finding the healthy number of drinks that achieved his/her desired level of sociability and on implementing this drink limit.

Additionally, college students who experienced negative drinking-related outcomes more frequently tended to report less frequent use of alcohol-safety-and-health strategies. After experiencing such outcomes, young adults are sometimes forced to enter abstinence-only treatment, incarcerated, and/or expelled from school, yet such forms of intervention are associated with a high prevalence of alcohol use and recidivism post treatment (Cutler & Fishbain, 2005; Substance Abuse and Mental Health Services Administration, 2008). Therefore, individuals may instead benefit from motivational, skill-building interventions that incorporate harm reduction strategies, as opposed to abstinence-based and punitive interventions. Harm reduction interventions could be aimed at identifying and changing the factors that contribute to students' drinking related problems, dialogue about barriers to using alcohol-safety-and-health strategies when drinking, and ways to overcome these obstacles.

The present study was also useful because it was the first to assess factors, other than drinking history and demographics, associated with engagement in both alcohol-reduction and alcohol-safety-and-health strategies. Therefore, it sets a model for research evaluating the associations between cognitive and behavioral factors and use of alcohol harm reduction strategies. One such study could evaluate the association of other factors in the Health Belief Model (i.e., benefits of and barriers to using strategies, self-efficacy) with the frequency with which students use alcohol harm reduction strategies. In addition, it may be helpful to assess susceptibility of and severity to a greater number of negative outcomes and more diverse outcome categories to better predict use of strategies. It may also be useful to evaluate whether the value placed on negative outcomes mediates and/or moderates the relationship between health belief factors, such as severity of outcomes, and use of harm reduction strategies. In addition, because of the pharmacological (e.g., central nervous system depressant) and psychological (e.g., disinhibition) effects of alcohol, the importance placed on outcomes may vary depending on whether or not one is drinking. Therefore, research is also needed to evaluate how much college students' value alcohol outcome expectancies when they envision themselves drinking or when they are actually drinking.

This line of research may also benefit from assessing the views of young adults who are not enrolled full-time in a four-year college. For example, young adults employed full-time or who are enrolled in a two-year university often reside in their hometown and/or have started their own family. Such young adults may have different drinking experiences and beliefs than four-year university students who are typically not married and who have moved to attend school. In addition, it may be useful to identify and assess emotional (e.g., mental health problems and stress management), religious (e.g., parents' and students' religious affiliations), and political

(e.g., liberal versus conservative ideology and partisan affiliation) factors that may be related to use of alcohol harm reduction strategies.

In conclusion, the present study identifies multiple cognitive and behavioral factors that are associated with university students' recent use of alcohol-reduction and alcohol-safety-and health strategies. If such factors inform practice and lead to more consistent use of alcohol harm reduction strategies, it is likely that there will be a reduction in young adults' drinking and negative drinking-related consequences.

REFERENCES

American College Health Association. (2011). *American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2011*. Hanover, MD: American College Health Association.

Bandura, A. (1977). *Social Learning Theory*. Oxford, England: Prentice-Hall.

Becker, M. H. (1974). The Health Belief Model and personal health behavior. *Health Education Monographs, 2*, 324-508.

Benton, S.L., Schmidt, J.L., Newton, F.B., Shin, K., Benton, S.A., & Newton, D.W. (2004). College student protective strategies and drinking consequences. *Journal of Studies on Alcohol*, *65*, 115-121.

Bonar, E.E., Rosenberg, H., Hoffmann, E., Kraus, S.W., Kryszak, E., Young, K.M….Bannon, E.E. (2011). Measuring university students' self-efficacy to employ drinking self-control strategies. *Psychology of Addictive Behaviors*.

Bonar, E., Rosenberg, H., & Hoffmann, E. (2011, June). *Predictors of college students' recent use of and future intentions to use alcohol-related harm reduction strategies*. Poster session presented at the Annual Research Society on Alcoholism Scientific Meeting, Atlanta, GA.

Boone, T. L., & Lefkowitz, S. (2004). Safer sex and the Health Belief Model: Considering the contributions of peer norms and socialization factors. *Journal of Psychology & Human Sexuality*, *16*(1), 51-68.

Borders, A., Earleywine, M., & Huey, S. J. (2004). Predicting problem behaviors with multiple expectancies: Expanding Expectancy-Value Theory. *Adolescence*, *39*(155), 539-550.

Brown, S. A., Christiansen, B. A., & Goldman, M. S. (1987). The Alcohol Expectancy Questionnaire: An instrument for the assessment of adolescent and adult alcohol expectancies. *Journal of Studies on Alcohol, 48*(5), 483-491.

Brown, S. A., Goldman, M. S., & Christiansen, B. A. (1985). Do alcohol expectancies mediate drinking patterns of adults? *Journal of Consulting and Clinical Psychology*, *53*(4), 512-519.

Brown, S. A., Goldman, M. S., Inn, A., & Anderson, L. R. (1980). Expectations of reinforcement from alcohol: Their domain and relation to drinking patterns. *Journal of Consulting and Clinical Psychology*, *48*(4), 419-426.

Costa, F. M., Jessor, R., & Donovan, J. E. (1989). Value on health and adolescent conventionality: A construct validation of a new measure in problem-behavior theory. *Journal of Applied Social Psychology, 19*(10), 841 – 861.

Courtney, K.E., & Polich, J. (2009). Binge drinking in young adults: Data, definitions, and determinants. *Psychological Bulletin, 135,* 142-156.

Cremeens, J. L., Usdan, S. L., Brock-Martin, A., Martin, R. J., & Watkins, K. (2008). Parent-child communication to reduce heavy alcohol use among first-year college students. *College Student Journal*, *42*(1), 152-163.

Cutler, R. B. & Fishbain, D. A. (2005). Are alcoholism treatments effective? The Project MATCH data. *BMC Public Health, 5*(75), 1-11.

Davey, J., Richards, N., Lang, C. P., & Davies, A. (2006). The threat of hepatitis c as an influence on injecting amphetamine users' change towards non-injecting. *Journal of Child & Adolescent Substance Abuse*, *15*(4), 89-104.

Del Boca, F. K., Darkes, J., Goldman, M. S., & Smith, G. T. (2002). Advancing the expectancy

concept via the interplay between theory and research. *Alcoholism: Clinical and Experimental Research*, *26*(6), 926-935.

Delva, J., Smith, M.P., Howell, R.L., Harrison, D.F., Wilke, D., & Jackson, D.L. (2004). A study of the relationship between protective behaviors and drinking consequences among undergraduate college students. *Journal of American College Health*, *53*, 19-26.

Frazier, P. A., & Tix, A. P. (2004). Testing moderator and mediator effects in counseling psychology. *Journal of Counseling Psychology, 51*, 115-134.

Fromme, K., & D'Amico, J. (2000). Measuring adolescent alcohol outcome expectancies. *Psychology of Addictive Behaviors*, *14*(2), 206-212.

Fromme, K., Stroot, E. A., & Kaplan, D. (1993). Comprehensive effects of alcohol: Development and psychometric assessment of a new expectancy questionnaire. *Psychological Assessment*, *5*(1), 19-26

Ham, L. S., & Hope, D. A. (2003). College students and problematic drinking: A review of the literature. *Clinical Psychology Review, 23*, 719–759.

Ham, L. S., Stewart, S. H., Norton, P. J., & Hope, D. A. (2005). Psychometric Assessment of the Comprehensive Effects of Alcohol Questionnaire: Comparing a Brief Version to the Original Full Scale. *Journal of Psychopathology and Behavioral Assessment*, *27*(3), 141-158.

Harris, S. M. (2004). The effect of health value and ethnicity on the relationship between hardiness and health behaviors. *Journal of Personality, 72*(2), 379-409.

Hathaway, A. D., & Tousaw, K. I. (2008). Harm reduction headway and continuing resistance: Insights from safe injection in the city of Vancouver. *The International Journal on Drug Policy, 19*(1), 11-16.

Hays, R. (1985). An integrated Value-Expectancy Theory of alcohol and other drug use. *British Journal of Addiction, 80*, 379-384.

Hingson, R. W., Heeren, T., Zakocs, R. C., Kopstein, A., & Wechsler, H. (2002). Magnitude of Alcohol-Related Mortality and Morbidity among U.S. College Students Ages 18-24. *Journal of Studies on Alcohol*, *63*(2), 136-144.

Hoffmann, E., Ashrafioun, L., Bannon, E. E., Young, K. M., Bonar, E. E., Rosenberg, H….Baik, K. (2011, April). *Assessing university students' past use, current confidence, and future intention to use alcohol-reduction strategies.* Poster session presented at the Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine, Washington, D.C.

Holyfield, L., Ducharme, L. J., & Martin, J. K. (1995). Drinking contexts, alcohol beliefs, and patterns of alcohol consumption: Evidence for a comprehensive model of problem drinking. *Journal of Drug Issues, 25*(4), 783-799.

Hurlbut, S. C., & Sher, K. J. (1992). Assessing alcohol problems in college students. *Journal of American College Health, 41*(2), 49-58.

Huxley, C., & Grogan, S. (2005). Tattooing, piercing, healthy behaviours and health value. *Journal of Health Psychology*, *10*(6), 831-841.

Janz, N. K., & Becker, H. (1984). The Health Belief Model: A decade later. *Health Education Quarterly*, *11*(1), 1-47.

Jones, B. T., Corbin, W., & Fromme, K. (2001). A review of expectancy theory and alcohol consumption. *Addiction*, *96*, 57–72.

Jones, B. T., & McMahon, J. (1996). A comparison of positive and negative alcohol expectancy and value and their multiplicative composite as predictors of post-treatment abstinence survivorship. *Addiction*, *91*(1), 89-99.

Jones, B. T., & McMahon, J. (1994). Negative alcohol expectancy predicts post-treatment abstinence survivorship: The whether, when and why of relapse to a first drink. *Addiction*, *89*(12), 1653-1665.

Kagee, A. (2008). Adherence to antiretroviral therapy in the context of the national roll-out in South Africa: Defining a research agenda for psychology. *South African Journal of Psychology, 38*(2), 413-428.

Knauper, B., Rabiau, M., Cohen, O., & Patriciu, N. (2004). Compensatory health beliefs: Scale development and psychometric properties. *Psychology & Health*, *19*(5), 607-624.

Kriegler, K. A., Baldwin, J. N., & Scott, D. M. (1994). A survey of alcohol and other drug use behaviors and risk factors in health profession students. *Journal of American College Health*, *42*(6), 259-265.

Lau, R. R., Hartman, K. A., & Ware, J. E. (1986). Health as a value: Methodological and theoretical considerations. *Health Psychology*, *5*(1), 25-43

Leigh, B. C. (1987). Beliefs about the effects of alcohol on self and others. (1987). *Journal of Studies on Alcohol, 48*(5), 467-475.

Levy, B., & Earleywine, M. (2003). Reinforcement expectancies for studying predict drinking problems among college students: Approaching drinking from an expectancies choice perspectives. *Addictive Behaviors*, *28*(3), 551-559.

Lewis, B. A., & O'Neill, K. (2000). Alcohol expectancies and social deficits relating to problem drinking among college students. *Addictive Behaviors*, *25*(2), 295-299.

Lollis, C. M., Antoni, M. H., Johnson, E. H., Chitwood, D. C., & Griffin, D. K. (1995). Does the Health Belief Model predict risky sexual practices in injection drug users? *Clinical Psychology and Psychotherapy, 2*(4), 227-233.

Lollis, C. M., Johnson, E. H., & Antoni, M. H. (1997). The efficacy of the Health Belief Model for predicting condom usage and risky sexual practices in university students. *AIDS Education and Prevention, 9*(6), 551-563.

MacCoun, R. J. (1998). Toward a psychology of harm reduction. *American Psychologist, 53*(11), 1199-1208.

Maddock, J. E., Laforge, R. G., Rossi, J. S., & O'Hare, T. (2001). The College Alcohol Problems Scale. *Addictive Behaviors, 26*, 385-398.

Mallett, K. A., Bachrach, R. L., & Turrisi, R. (2008). Are all negative consequences truly negative? Assessing variations among college students' perceptions of alcohol related consequences. *Addictive Behaviors, 33*(10), 1375-1381.

Marlatt, G. A. (1996). Harm reduction: Come as you are. *Addictive Behaviors*, *21*(6), 779-788.

Martens, M. P., Ferrier, A. G., Sheehy, M. J., Corbett, K., Anderson, D. A., & Simmons, A. (2005). Development of Protective Behavioral Strategies Survey. *Journal of Studies on Alcohol, 66,* 698-705.

Martens, M. P., Pederson, E. R., LaBrie, J. W., Ferrier, A. G., & Cimini, M. D. (2007). Measuring alcohol-related protective behavioral strategies among college students: Further examination of the Protective Behavioral Strategies Scale. *Psychology of Addictive Behaviors*, *21*(3), 307-315.

Martens, M. P., Taylor, K. K., Damann, K. M., Page, J. C., Mowry, E. S., & Cimini, M. D. (2004). Protective Behavioral Strategies When Drinking Alcohol and Their Relationship to Negative Alcohol-Related Consequences in College Students. *Psychology of Addictive Behaviors*,*18*(4), 390-393.

McCarty, D., Morrison, S., & Mills, K. C. (1983). Attitudes, beliefs, and alcohol use; An

analysis of relationships. *Journal of Studies on Alcohol, 44*(2), 328-341.

McMahon, J., Jones, B. T., & O'Donnell, P. (1994). Comparing positive and negative alcohol expectancies in male and female social drinkers. *Addiction Research*, *1*(4), 349-365.

Minugh, P. A., Rice, C., & Young, L. (1998). Gender, health beliefs, health behaviors, and alcohol consumption. *The American Journal of Drug and Alcohol Abuse*, *24*(3), 483-497.

Mooney, D. K., Fromme, K., Kivlahan, D. R., & Marlatt, G. A. (1987). Correlates of alcohol consumption: Sex, age, and expectancies relate differentially to quantity and frequency. *Addictive Behaviors*, *12*(3), 235-240.

O'Hare, T. (1997). Measuring problem drinking in first time offenders. *Journal of Substance Abuse Treatment, 14*(4), 383-387.

O'Malley, P. M. & Johnston, L. D. (2002). Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol, 14,* 23-39.

Palfai, T. P., & Ostafin, D. (2003). The influence of alcohol on the activation of outcome expectancies: The role of evaluative expectancy activation in drinking behavior. *Journal of Studies on Alcohol*, *64*(1), 111-119.

Phillips, K. T., Rosenberg, H., & Sanikop, A. (2007). English and American drug clients' views of acceptability, advantages and disadvantages of treatment and harm-reduction interventions. *Journal of Drug Issues, 37*, 377-402.

Rabiau, M., Knauper, B., & Miquelon, P. (2006). The eternal quest for optimal balance between maximizing pleasure and minimizing harm: The compensatory health beliefs model. *British Journal of Health Psychology*, *11*(1), 139-153.

Redding, C. A., Rossi, J. S., Rossi, S. R., Velicer, W. F., & Prochaska, J. O. (2000). Health behavior models. *The International Electronic Journal of Health Education, 3*, 180-193.

Ritter, A. & Cameron, J. (2006). A review of the efficacy and effectiveness of harm reduction strategies for alcohol, tobacco, and illicit drugs. *Drug and Alcohol Review, 25,* 611-624.

Roehling, P. V., & Goldman, M. S. (1987). Alcohol expectancies and their relationship to actual drinking practices. *Psychology of Addictive Behaviors, 1*(2), 108-113.

Rogers, R. W., Deckner, C. W., & Mewborn, C. R. (1978). An expectancy-value theory approach to the long-term modification of smoking behavior. *Journal of Clinical Psychology*, *34*(2), 562-566.

Rosenberg, H., Bonar, E. E., Hoffmann, E., Kryszak, E., Young, K. M., Kraus, S. W….Pavlick, M. (in press). Assessing university students' self-efficacy to employ alcohol-related harm reduction strategies. *The Journal of American College Health.*

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education Quarterly, 15*(2), 175-183.

Sher, K. J., Wood, M. D., Wood, P. K., & Raskin, G. (1996). Alcohol outcome expectancies and alcohol use: A latent variable cross-lagged panel study. *Journal of Abnormal Psychology*, *105*(4), 561-574.

Siebert, D. C., Wilke, D. J., Delva, J., Smith, M. P., & Howell, R. L. (2003). Differences in African American and White college students' drinking behaviors: Consequences, harm reduction strategies, and health information sources. *Journal of American College Health, 52*(3), 123-129.

Stacy, A. W., Widaman, K. F., & Marlatt, G. A. (1990). Expectancy models of alcohol use. *Journal of Personality and Social Psychology*, *58*(5), 918-928.

Strathdee, S. A., & Vlahov, D. (2001). The effectiveness of needle exchange programs: A review of the science and policy. *AIDScience, 1*(16), 1-33.

Substance Abuse and Mental Health Services Administration. (2010). *Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings* (Office of Applied Studies, NSDUH Series H-38A, HHS Publication No. SMA 10-4586 Findings). Rockville, MD.

Substance Abuse and Mental Health Services Administration, Office of Applied Studies. (August 14, 2008). *The DASIS Report: First-Time and Repeat Admissions Aged 18 to 25 to Substance Abuse Treatment: 2006*. Rockville, MD.

Sugarman, D. E., & Carey, B. (2007). The relationship between drinking control strategies and college student alcohol use. *Psychology of Addictive Behaviors*, *21*(3), 338-345.

Von Ah, D., Ebert, S., Ngamvitroj, A., Park, N., & Kang, D. H. (2004). Predictors of health behaviours in college students. *Journal of Advanced Nursing, 48*(5), 463-474.

Wall, A., Thrussell, C., & Lalonde, R. N. (2003). Do alcohol expectancies become intoxicated outcomes? A test of social-learning theory in a naturalistic bar setting. *Addictive Behaviors*, *28*(7), 1271-1283.

Walters, S.T., Roudsari, B.S., Vader, A.M., & Harris, T.R. (2007). Correlates of protective behavior utilization among heavy-drinking college students. *Addictive Behaviors*, *32*, 2633-2644.

Wechsler, H., Lee, J. E., Kuo, M., Seibring, M., Nelson, T. F., & Lee, H. (2002). Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 Harvard School of Public Health college alcohol study surveys: 1993-2001. *Journal of American College Health, 50*, 203-217.

Wechsler, H., & Nelson, T. F. (2008). What we have learned from the Harvard School of Public

Health College Alcohol Study: Focusing attention on college student alcohol consumption and the environmental conditions that promote it. *Journal of Studies on Alcohol and Drugs, 69,* 481-490.

Welch, K. J. (2000). Correlates of alcohol and/or drug use among HIV-infected individuals. *AIDS Patient Care and STDs*, *14*(6), 317-323.

Werch, C. E. (1990). Behavioral self-control strategies for deliberately limiting drinking among college students. *Addictive Behaviors*, *15*(2), 119-128.

Werner, M. J., Walker, L. S., & Greene, J. W. (1993). Alcohol expectancies, problem drinking, and adverse health consequences. *Journal of Adolescent Health*, *14*(6), 446-452.

Wood, M. D., Sher, K. J., & Stratham, A. (1996). Alcohol outcome expectancies: Expectancies and alcohol use and problems. *Journal of Studies on Alcohol and Drugs, 57*, 283-288.

Ziegler, D. W., Wang, C. C., Yoast, R. A., Dickinson, B. D., McCaffree, M. A., Robinowitz, C. B., & Sterling, M. L. (2005). The neurocognitive effects of alcohol on adolescents and college students. *Preventive Medicine, 40*, 23-32.

Table 1

Characteristics of Participants

Demographic Characteristic	Percentage of Sample
Gender	
Female	58%
Male	42
Age	
18 years old	17%
19 years old	35
20 years old	17
21 years old	14
22 years old and over	16
Ethnicity	
White/European American	90%
Black/African American	6
Other	4
Year in College	
Freshman	49%
Sophomore	19
Junior	16
Senior	16
Grade Point Average	
3.5 to 4.0	25%
3.0 to 3.49	30
2.0 to 2.99	41
Below 2.0	5
College Major	
Arts and Sciences	31%
Education and Human Development	28
Health and Human Services	20
Business Administration	7
Technology	3
Musical Arts	3
Undeclared	8
College Status	
Full-Time Student	98%
Part-Time Student	2

Housing	
Live On Campus	62%
Live Off Campus	38
Employment	
No Job	53%
Part-Time Job	45
Full-Time Job	3

Note. Proportions may add up to more than 100% due to rounding.

Table 2

Participants' Alcohol Use History

Alcohol Use Characteristic	Percent or Mean (SD)
Age of first drink of alcohol	
12 years old or younger	7%
13 – 14 years old	19
15 – 16 years old	35
17 – 18 years old	31
19 – 20 years old	6
21 years old or older	2
Age of first time "drunk"	
12 years old or younger	1%
13 – 14 years old	10
15 – 16 years old	31
17 – 18 years old	38
19 – 20 years old	9
21 years old or older	3
Never been drunk	8
Been "drunk" in past four weeks	
Yes	75%
No	25
Days drink alcohol in typical week	1.51 (1.2)
Frequency of drinking days in typical week	
0 days	19%
1 day	35
2 days	29
3 days	14
4 or more days	3
Alcoholic drinks consumed on typical drinking day	6.06 (3.6)
Frequency of drinks consumed on typical drinking day	
0 – 1 drink	6%
2 – 3 drinks	20
4 – 5 drinks	23
6 – 7 drinks	22
8 – 9 drinks	11
10 – 11 drinks	10
12 or more drinks	9

Typical type of alcoholic drink	
Only beer	22%
Only liquor	24
Only wine	3
Combination of beer, liquor, wine	51
Number of binges in past four weeks[a]	3.93 (4.6)
Frequency of binge drinking in past four weeks[a]	
0 times	21%
1 – 2 times	32
3 – 4 times	18
5 – 8 times	17
9 – 12 times	8
13 or more times	5
Ability to control use	
Completely under control	75%
Somewhat under control	22
Somewhat out of control	3
Completely out of control	<1
Ease with which could abstain for next month	
Very easy	66%
Somewhat easy	22
Somewhat difficult	9
Very difficult	3
Friends who drink alcohol	
None	<1%
About one-quarter	6
About half	11
About three-quarters	43
All or almost all	39

Note. Proportions may not add up to 100% because of rounding.
[a]Binge is defined as 4+ drinks if female or 5+ drinks if male.

Table 3

Drinking-Related Outcomes Experienced by Participants During the Previous Year

Outcome Category	Percentage of Sample
Had a headache (hangover)[a]	79%
Felt sick to stomach or thrown up	72
Experienced memory loss (black out)[a]	68
Felt sad/low mood after drinking[a]	45
Missed work or school[a]	40
Felt angry, hostile, or aggressive after drinking[a]	37
Gotten into sexual situations that you later regretted	36
Felt like you needed larger amounts of alcohol to get an effect	35
Felt guilty about your drinking	34
Engaged in risky sexual activity[a]	32
Drinking created problems with your partner	30
Showed up late for work or school	30
Drove a car when had too much to drink	28
Partner, parent, or relative complained about your drinking	25
Received a lower grade on an exam or paper	21
Gotten into physical fights	15
Neglected obligations, family, work, or school for two or more days	14
Damaged property or set off a false alarm	13
Felt like you needed or were dependent on alcohol	10
Felt like you needed a drink after waking up	10
Lost friends	9
Had “the shakes” after cutting down or stopping drinking	8
Got into trouble at work or school	6
Doctor told you that your drinking was harming your health	5
Experienced alcohol poisoning[a]	4
Experienced physical injury that required medical care[a]	4
Got help to control your drinking	4
Been arrested related to non-driving drinking behaviors	3

Attended Alcoholics Anonymous	3
Sought professional help for your drinking	3
Been fired from a job or suspended or expelled from school	2
Been arrested for driving-related offense	2

[a]Outcomes were included in the AOPSS; all other outcomes were part of the YAAPST

Table 4

Frequency of AOPSS Consequences Experienced by Participants

Outcome Category	Percentage of Sample
Experienced a hangover	
Never	15%
More than one year ago	6
1 time in past year	13
2 times in past year	11
3 times in past year	12
4 – 6 times past year	15
7 – 11 times in past year	13
12 – 20 times in past year	10
21 or more times in past year	6
Experienced a black out	
Never	23%
More than one year ago	10
1 time in past year	21
2 times in past year	12
3 times in past year	9
4 – 6 times in past year	10
7 – 11 times in past year	6
12 – 20 times in past year	7
21 or more times in past year	3
Felt sad or experienced low mood after drinking	
Never	48%
More than one year ago	7
1 time in past year	15
2 times in past year	9
3 times in past year	8
4 – 6 times past year	7
7 – 11 times in past year	3
12 – 20 times in past year	1
21 or more times in past year	1
Felt angry, hostile, or aggressive after drinking	
Never	59%
More than one year ago	4
1 time in past year	13
2 times in past year	8
3 times in past year	6

4 – 6 times past year	6
7 – 11 times in past year	1
12 – 20 times in past year	1
21 or more times in past year	1
Engaged in risky sexual activity	
Never	57%
More than one year ago	11
1 time in past year	13
2 times in past year	5
3 times in past year	6
4 – 6 times past year	4
7 – 11 times in past year	2
12 – 20 times in past year	1
21 or more times in past year	1
Missed work or class related to drinking	
Never	57%
More than one year ago	7
1 time in past year	11
2 times in past year	8
3 times in past year	8
4 – 6 times past year	6
7 – 11 times in past year	2
12 or more times in past year	1
Experienced physical injury that required medical	
Never	92%
More than one year ago	4
1 time in past year	3
2 times in past year	1
3 – 11 times in past year	1
Experienced alcohol poisoning	
Never	94%
More than one year ago	3
1 time in past year	3
2 times in past year	1
3 – 6 times in past year	<1

Note. Proportions may not add up to 100% because of rounding.

Table 5

Alcohol-Reduction Scale (ARS-Past): Means and Standard Deviations for Each Strategy

ARS-Past Items	Mean (SD)
Eat a meal before starting to drink	4.09 (1.14)
Avoid starting a new drink until you'd finished the one you had	3.99 (1.35)
Avoid drinking out of oversize containers (e.g., fishbowls, boots, giant cups)	3.72 (1.56)
Say “no" to offers of drinks you didn't want	3.70 (1.43)
Bring a limited amount of spending money with you when you went out to drink	3.60 (1.49)
Sip your drink, rather than gulping or chugging	3.40 (1.21)
Keep track in your head of each drink you had	3.34 (1.54)
Avoid adding more alcohol to a drink you had not finished	3.24 (1.56)
Avoid drinking in rounds (e.g., taking turns buying drinks for a group)	3.18 (1.56)
Avoid finishing a beer or other drink you didn't want	3.11 (1.47)
Avoid “catching up” if you started drinking after others	3.04 (1.52)
Avoid drinking straight shots of hard liquor	2.74 (1.47)
Set down your drink between each sip	2.68 (1.37)
Leave the place where you were drinking at a pre-determined time	2.58 (1.40)
Start off with at least 1 non-alcoholic drink before you started drinking alcohol	2.52 (1.44)
Limit the amount of alcohol someone else put in any drink they made for you	2.49 (1.49)
Leave at least 15 minutes in between each drink	2.38 (1.28)
Avoid drinking with friends who drink excessively	2.30 (1.45)
Use a single shot glass to measure how much hard liquor went in each drink	2.27 (1.43)

Put extra non-alcoholic mixer in your drink	2.26 (1.37)
Set a limit on the total number of drinks you'd have before you started drinking	2.21 (1.40)
Avoid salty foods while drinking	2.14 (1.37)
Set a pre-determined time to stop drinking	2.03 (1.35)
Accept a drink offer, then set it aside without drinking it	1.97 (1.16)
Put extra ice in your drink	1.84 (1.24)
Wait at least 20 minutes past the time you'd normally start drinking	1.83 (1.10)
Stay away from the refrigerator/keg/bartender where alcohol was easily available	1.82 (1.19)
Ask the person making your drinks to make them weak	1.76 (1.15)
Have a non-alcoholic drink in between each alcoholic drink	1.74 (1.05)
Order a non-alcoholic drink that could pass as an alcoholic drink	1.51 (1.04)
Keep track of each drink on your cell phone or a piece of paper	1.16 (0.67)

Note. Responses options were scored as 1 = *Never,* 2 = *About one-fourth of the time,* 3 = *About half the time,* 4 = *About three-fourths of the time,* 5 = *Almost always or always*

Table 6

Alcohol-Safety-and-Health Scale (ASH-Past): Means and Standard Deviations for Each Strategy

ASH-Past Items	Mean (SD)
Carry a cell phone with you	4.89 (0.54)
Find a safe way to get someplace else from where you have been drinking (e.g., taxi, designated driver, bus, walk a safe route)	4.64 (0.87)
Stay close by a trusted friend	4.63 (0.84)
Avoid carrying a weapon	4.52 (1.19)
Avoid driving	4.46 (1.09)
Let your friends know where you are going if you decide to leave someplace without them	4.37 (1.05)
Avoid going somewhere with people you don't know	4.31 (1.11)
Wear clothes and shoes that are appropriate for the weather	4.27 (1.04)
Watch your drink, or have someone you trust watch your drink, at all times	4.26 (1.29)
Eat something before or while drinking	4.26 (1.03)
Avoid consuming drinks offered by people you do not know or trust	4.24 (1.24)
Avoid taking recreational drugs while drinking	4.19 (1.31)
Avoid swimming or using a hot tub	4.02 (1.51)
Walk away from arguments and conflicts with others	3.97 (1.15)
Use a condom if you engage in sexual activity	3.93 (1.48)
Avoid dehydration (e.g., drink water, juice, sports drinks)	3.74 (1.33)
Carry some cash with you that you would use only in an emergency	3.54 (1.57)

Note. Responses options were scored as 1 = *Never,* 2 = *About one-fourth of the time,* 3 = *About half the time,* 4 = *About three-fourths of the time,* 5 = *Almost always or always*

Table 7

Correlations Among Regression Predictor and Outcome Variables (Excluding Demographic Variables)

	Binge Status	YAAPST Problems	CAPS-r Problems	Expectancy RA/LC/Soc	Expectancy SP/CBI	Expectancy Sex	Expectancy TR	Exp-Value TR/Soc/Sex	Exp-Value LC/RA/SP	Exp-Value CBI	Outcome Susceptible	Outcome Severe	Outcome Value	Health Value	ARS	ASH
Binge Status	1	.57**	.06	.23**	-.10*	.22**	.03	.09*	.13**	.14**	.33**	-.24**	-.18**	.03	-.36**	-.26**
YAAPST Problems		1	.26**	.25**	.05	.32**	-.03	.12**	.14**	.15**	.54**	-.34**	-.29**	.01	-.36**	-.49**
CAPS-r Problems			1	.19**	.40**	.20**	-.04	.08	.11*	.02	.34**	-.06	-.04	-.07	-09*	-.14**
Expectancy RA/LC/Soc				1	.25**	.40**	.07	.28**	.33**	.17**	.37**	-.15**	-.05	.07	-.40**	-.19**
Expectancy SP/CBI					1	.17**	-.14**	.07	.07	-.03	.23**	.04	.06	.07	-.03	-.02
Expectancy Sex						1	.10*	.30**	.27**	.13**	-.20**	-.20**	-.14**	.05	-.31**	-.23**
Expectancy TR							1	.20**	.03	.08*	-.03	-.08	-.03	-.01	-.12**	-.03
Exp-Value TR/Soc/Sex								1	.48**	.02	.21**	-.13**	-.03	.01	-.21**	-.04
Exp-Value LC/RA/SP									1	.16**	.20**	-.18**	-.23**	.04	-.19**	-.17**
Exp-Value CBI										1	.10*	-.14**	-.18**	-.09*	-.24**	-.15**
Outcome Susceptible											1	-.31**	-19**	.05	-.36**	-.31**
Outcome Severe												1	.67**	.07	.36**	.32**
Outcome Value													1	.02	.20**	.27**
Health Value														1	-.02	.02

Note. CBI = Cognitive Behavioral Impairment, LC = Liquid Courage, RA = Risk and Aggression, SP = Self-Perception, Sex = Sexuality, Soc = Sociability, TR = Tension Reduction, ARS = Alcohol-Reduction Strategies, ASH = Alcohol-Safety-and-Health Strategies; *$p < .05$, **$p < .01$

Table 8

Hierarchical Regression Predicting Recent Use of Alcohol-Reduction Strategies

	Alcohol-Reduction Strategies				
	B	*SE B*	*B*	ΔR^2	*Adj.* R^2
Model 1: Step 1				.18**	.17**
Age	.03	.02	.07		
Gender	.13	.05	.09*		
Binge Drinking	-.03	.01	-.22**		
Frequency of Past-Year Outcomes (YAAPST)	-.01	.002	-.22**		
Personal Problem Subscale (CAPS-r)	-.02	.03	-.02		
Model 2: Steps 1 and 2				.16**	.32**
Age	.02	.02	.04		
Gender	.04	.05	.03		
Binge Drinking	-.02	.01	-.15**		
Frequency of Past-Year Outcomes (YAAPST)	-.003	.002	-.08		
Personal Problem Subscale (CAPS-r)	.02	.04	.02		
RA/LC/Soc Expectancy	-.26	.05	-.23**		
SP/CBI Expectancy	.02	.05	.01		
Sex Expectancy	-.04	.04	-.04		
TR Expectancy	-.04	.03	-.05		
TR/Soc/Sex Expectancy-Value	-.07	.05	-.07		
LC/RA/SP Expectancy-Value	.02	.04	.03		
CBI Expectancy-Value	-.13	.03	-.14**		
Susceptibility	-.11	.06	-.09		
Severity	.24	.05	.24**		
Value (AOPSS)	-.10	.07	-.07		
Health Value (VHS)	-.02	.04	-.02		

Note. CBI = Cognitive Behavioral Impairment, LC = Liquid Courage, RA = Risk and Aggression, SP = Self-Perception, Sex = Sexuality, Soc = Sociability, TR = Tension Reduction
*$p < .05$, **$p < .01$

Table 9

Hierarchical Regression Predicting Recent Use of Alcohol-Safety-and-Health Strategies

	Alcohol-Safety-and-Health Strategies				
	B	*SE B*	*β*	ΔR^2	*Adj.* R^2
Model 1: Step 1				.22**	.21**
Age	-.002	.02	-.004		
Gender	.16	.04	.14**		
Binge Drinking	.00	.01	.001		
Frequency of Past-Year Outcomes (YAAPST)	-.01	.001	-.43**		
Personal Problem Subscale (CAPS-r)	-.02	.03	-.03		
Model 2: Steps 1 and 2				.05**	.25**
Age	-.02	.02	-.04		
Gender	.13	.04	.11**		
Binge Drinking	.004	.01	.03		
Frequency of Past-Year Outcomes (YAAPST)	-.01	.001	-.34**		
Personal Problem Subscale (CAPS-r)	-.01	.03	-.01		
RA/LC/Soc Expectancy	-.04	.04	-.04		
SP/CBI Expectancy	.01	.04	.01		
Sex Expectancy	-.03	.03	-.04		
TR Expectancy	-.02	.03	-.03		
TR/Soc/Sex Expectancy-Value	.12	.04	.13**		
LC/RA/SP Expectancy-Value	-.07	.03	-.10*		
CBI Expectancy-Value	-.03	.03	-.05		
Susceptibility	-.08	.05	-.07		
Severity	.12	.04	.14**		
Value (AOPSS)	.02	.06	.02		
Health Value (VHS)	.02	.03	.02		

Note. CBI = Cognitive Behavioral Impairment, LC = Liquid Courage, RA = Risk and Aggression, SP = Self-Perception, Sex = Sexuality, Soc = Sociability, TR = Tension Reduction
*$p < .05$, **$p < .01$

Appendix A

DEFINITIONS OF BEHAVIORAL COMPENSATION GENERATED BY FOCUS GROUP

"Behavioral compensation related to drinking alcohol is any type of behavior a person does when influenced with alcohol prior to drinking or after drinking."
"I think these are behaviors you chose to do either before or after you drink to make yourself feel better and be healthier."
"It is a behavior that helps you before and after drinking to make you safer."
"Behavioral compensation means actions that you take before and/or after drinking alcohol in order to stay safe and healthy."
"Behavioral compensation: What you do in order to prepare yourself for a long night or just a party night, concerning alcohol."
"Behavioral compensation is basically doing specific things either before or after you drink in order for your body to be better prepared."
"Behavioral compensation are things you do prior to or after drinking to positively influence your decision to drink. They are things you do to help yourself after drinking either mentally or physically."
"Behavioral compensation is behaviors or strategies you do before you drink or when you know your going to drink. For example, if you are going to a big party on Saturday, you may not drink all week until the party. Some may exercise and eat healthy to maintain a healthy lifestyle even though they drink. Some may just do this on the regular anyways."
"Behavioral compensation would be doing things throughout the day before you go out or after you go out to prevent side effects of drinking."
"Doing something after you have passed your drinking limit that will make you feel better and not regret drinking that much in the first place."
"Behavioral compensation – Things that you can do in the future (or the day after drinking) to make up for your drinking the day before."
"Ways to make up for drinking. Positive actions to outway negative actions that occur from drinking."
"Behavioral compensation related to drinking is when you make smart beneficial decisions while drinking that make sure you stay safe while drinking."
"Behavioral compensation – Reasons or behaviors that would increase your likelihood of drinking."
"Excuses for why people drink. Makes you feel better being able to justify it."
"Behavioral compensation is one's own mind telling itself that it is okay to drink for different reasons. In a sense, it is an excuse or excuses for one to drink."

Appendix B

BEHAVIORAL COMPENSATION STRATEGIES GENERATED BY FOCUS GROUP PARTICIPANTS

Behavioral Compensation Strategy	Frequency of Strategy
Eating a healthy meal or any type of food before/after drinking	9
Drinking a lot of water before/after drinking alcohol	7
Exercising or working out before/day after drinking	7
Getting plenty of sleep (at least 8 hours) or taking a nap the day you drink	6
Completing all homework and studies before drinking	5
Planning your night out so you know what exactly you will be doing	3
Having fun	2
Making sure you have a way home or walking back with friends	2
Completing all necessary plans/tasks before drinking	2
Making sure you have everything you need for the night	1
Making sure you have somewhere to stay after drinking	1
Taking aspirin after you get home from drinking	1
Refraining from drinking all week until the weekend	1
Saving money just for alcohol if you know there will be a party	1
Talking to a friend about the situation	1
Drinking less one night if you had a hangover the previous night	1
Apologizing if you got too drunk and did/said something embarrassing	1
If you drink too much, taking a long break from drinking	1
If you cause physical damage while drinking, somehow making up for it	1
Staying with friends	1
Grabbing/pouring your own drinks, never taking a drink from a stranger	1
Keeping purse/hand bag with you or somewhere safe	1
Vacationing	1
Becoming legal to drink (such as turning 21 or traveling to another country)	1
Having a good day	1
Preparing for change	1
Meeting people	1
Feeling bored	1
Meeting girls	1
Breaking up with girlfriend/boyfriend	1
Having a day off from school	1

Celebrating	1
Attending parties	1
Becoming stupid for no reason	1
Easing pain	1
Forgetting	1

Appendix C

ARS-PAST

Rate how often you used each of the strategies listed below during the previous four weeks when you drank alcohol. If any of the strategies did not apply to you, choose "did not apply."

When you drank alcohol during the previous four weeks, how often DID you…

	Never	About one-fourth of the times	About half the times	About three-fourths of the times	Almost always or always	*Did not apply*
1) Leave at least 15 minutes in between each drink	○	○	○	○	○	○
2) Keep track in your head of each drink you had	○	○	○	○	○	○
3) Keep track of each drink on your cell phone or a piece of paper	○	○	○	○	○	○
4) Eat a meal before starting to drink	○	○	○	○	○	○
5) Avoid salty foods while drinking	○	○	○	○	○	○
6) Stay away from the refrigerator, keg, or bartender where alcohol was easily available	○	○	○	○	○	○
7) Have a non-alcoholic drink in between each alcoholic drink	○	○	○	○	○	○
8) Start off with at least 1 non-alcoholic drink before you started drinking alcohol	○	○	○	○	○	○
9) Set a limit on the total number of drinks you'd have before you started drinking	○	○	○	○	○	○
10) Set a pre-determined time to stop drinking	○	○	○	○	○	○
11) Sip your drink, rather than gulping or chugging	○	○	○	○	○	○
12) Avoid finishing a beer or other drink you didn't want	○	○	○	○	○	○
13) Wait at least 20 minutes past the time you'd normally start drinking	○	○	○	○	○	○
14) Avoid adding more alcohol to a drink you had not finished	○	○	○	○	○	○
15) Avoid starting a new drink until you'd finished the one you had	○	○	○	○	○	○
16) Avoid drinking out of oversize containers	○	○	○	○	○	○

(e.g., fishbowls, boots, giant cups)

17) Set down your drink between each sip	○	○	○	○	○	○
18) Avoid drinking in rounds (e.g., taking turns buying drinks for a group)	○	○	○	○	○	○
19) Avoid "catching up" if you started drinking after others	○	○	○	○	○	○
20) Say "no" to offers of drinks you didn't want	○	○	○	○	○	○
21) Accept a drink offer, then set it aside without drinking it	○	○	○	○	○	○
22) Leave the place where you were drinking at a pre-determined time	○	○	○	○	○	○
23) Avoid drinking with friends who drink excessively	○	○	○	○	○	○
24) Order a non-alcoholic drink that could pass as an alcoholic drink	○	○	○	○	○	○
25) Bring a limited amount of spending money with you when you went out to drink	○	○	○	○	○	○
26) Use a single shot glass to measure how much hard liquor went in each drink	○	○	○	○	○	○
27) Limit the amount of alcohol someone else put in any drink they made for you	○	○	○	○	○	○
28) Ask the person making your drinks to make them weak	○	○	○	○	○	○
29) Put extra ice in your drink	○	○	○	○	○	○
30) Put extra non-alcoholic mixer in your drink	○	○	○	○	○	○
31) Avoid drinking straight shots of hard liquor	○	○	○	○	○	○

Appendix D

ASH-PAST

Rate how often you used each of the strategies listed below during the previous four weeks when you drank alcohol. If any of the strategies did not apply to you, choose "did not apply."

When you drank alcohol in the previous four weeks, how often DID you…

	Never	About one-fourth of the times	About half the times	About three-fourths of the times	Almost always or always	*Did not apply*
1) Stay close by a trusted friend	○	○	○	○	○	○
2) Find a safe way to get someplace else from where you have been drinking (e.g., taxi, designated driver, bus, walk a safe route)	○	○	○	○	○	○
3) Let your friends know where you are going if you decide to leave someplace without them	○	○	○	○	○	○
4) Carry some cash with you that you would use only in an emergency	○	○	○	○	○	○
5) Avoid swimming or using a hot tub	○	○	○	○	○	○
6) Use a condom if you engage in sexual activity	○	○	○	○	○	○
7) Carry a cell phone with you	○	○	○	○	○	○
8) Watch your drink, or have someone you trust watch your drink, at all times	○	○	○	○	○	○
9) Avoid dehydration (e.g., drink water, juice, sports drinks)	○	○	○	○	○	○
10) Eat something before or while drinking	○	○	○	○	○	○
11) Avoid carrying a weapon	○	○	○	○	○	○
12) Avoid taking recreational drugs while drinking	○	○	○	○	○	○
13) Avoid consuming drinks offered by people you do not know or trust	○	○	○	○	○	○
14) Wear clothes and shoes that are appropriate for the weather	○	○	○	○	○	○
15) Avoid going somewhere with people	○	○	○	○	○	○

	Never	About one-fourth of the times	About half the times	About three-fourths of the times	Almost always or always	*Did not apply*
you don't know						
16) Avoid driving	○	○	○	○	○	○
17) Walk away from arguments and conflicts with others	○	○	○	○	○	○

Appendix E

B-CEOA

Please mark your responses below.

How good or bad would it be to…

	Good	**Somewhat good**	**Neutral**	**Somewhat bad**	**Bad**
1) enjoy sex more	○	○	○	○	○
2) feel dizzy	○	○	○	○	○
3) be clumsy	○	○	○	○	○
4) be loud, boisterous, or noisy	○	○	○	○	○
5) feel peaceful	○	○	○	○	○
6) brave and daring	○	○	○	○	○
7) be courageous	○	○	○	○	○
8) act aggressively	○	○	○	○	○
9) feel guilty	○	○	○	○	○
10) feel calm	○	○	○	○	○
11) feel moody	○	○	○	○	○
12) talk to people easier	○	○	○	○	○
13) be a better lover	○	○	○	○	○
14) take risks	○	○	○	○	○
15) act sociable	○	○	○	○	○

If I were under the influence of alcohol...

	Disagree	**Slightly Disagree**	**Slightly Agree**	**Agree**
1) I would enjoy sex more	○	○	○	○
2) I would feel dizzy	○	○	○	○
3) I would be clumsy	○	○	○	○
4) I would be loud, boisterous, or noisy	○	○	○	○
5) I would feel peaceful	○	○	○	○
6) I would be brave and daring	○	○	○	○
7) I would be courageous	○	○	○	○
8) I would act aggressively	○	○	○	○
9) I would feel guilty	○	○	○	○
10) I would feel calm	○	○	○	○
11) I would feel moody	○	○	○	○
12) It would be easier to talk to people	○	○	○	○
13) I would be a better lover	○	○	○	○
14) I would take risks	○	○	○	○
15) I would act sociable	○	○	○	○

Appendix F

AOPSS

*Please answer the next three questions about **alcohol poisoning**.*

1) Estimate how likely it is that – sometime in the future – you will drink so much alcohol in a short amount of time that you will need immediate professional medical care because of problems with consciousness, breathing, or upset stomach?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

2) How serious would it be if you drank so much alcohol in a short amount of time that you had problems with consciousness, breathing, or upset stomach that required immediate professional medical care?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

3) How good or bad would it be if you drank so much alcohol in a short amount of time that you had problems with consciousness, breathing, or upset stomach that required immediate professional medical care?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

*Please answer the next three questions about **physical injury after drinking alcohol**.*

4) Estimate how likely it is that – sometime in the future – you will receive professional medical care for an injury to your body that occurs after drinking alcohol?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

5) How serious would it be if you injured your body after drinking alcohol to the degree that you needed professional medical care?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

6) How good or bad would it be if you injured your body after drinking alcohol to the degree that you needed professional medical care?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

*Please answer the next set of questions about "**blacking out**" after drinking alcohol.*

7) Estimate how likely it is that – sometime in the future – you will not be able to remember things that happen during part of or during the whole time when you have been drinking?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

8) How serious would it be if you were not able to remember things that happened during part of or during the whole time when you have been drinking?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

9) How good or bad would it be if you were not able to remember things that happened during part of or during the whole time when you have been drinking?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

Please answer the next three questions about experiencing a "***hangover***" *after drinking alcohol.*

10) Estimate how likely it is that – sometime in the future – you will experience a headache, nausea, dizziness, or other physical symptoms the day after drinking alcohol?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

11) How serious would it be if you experienced a headache, nausea, dizziness, or other physical symptoms the day after drinking alcohol?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

12) How good or bad would it be if you experienced a headache, nausea, dizziness, or other physical symptoms the day after drinking alcohol?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

Please answer the next three questions about ***sexual activity after drinking alcohol.***

13) Estimate how likely it is that – sometime in the future – you will engage in sexual activity that you believe is risky to your health or safety after drinking alcohol?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

14) How serious would it be if you engaged in sexual activity that you believe was risky to your health or safety after drinking alcohol?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

15) How good or bad would it be if you engaged in sexual activity that you believe was risky to your health or safety after drinking alcohol?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

Please answer the next three questions about experiencing ***sadness after drinking alcohol.***

16) Estimate how likely it is that – sometime in the future – you will feel sad or experience low mood after drinking alcohol?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

17) How serious would it be if you were sad or experienced low mood after drinking alcohol?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

18) How good or bad would it be if you were sad or experienced low mood after drinking alcohol?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

Please answer the next three questions about experiencing ***anger after drinking alcohol.***

19) Estimate how likely it is that – sometime in the future – you will feel angry, hostile, or aggressive after drinking alcohol?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

20) How serious would it be if you felt angry, hostile, or aggressive after drinking alcohol?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

21) How good or bad would it be if you felt angry, hostile, or aggressive after drinking alcohol?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

Please answer the next three questions about ***missing work or school because of drinking alcohol.***

22) Estimate how likely it is that – sometime in the future – you will miss work or class because you will not feel well after drinking alcohol?

Very unlikely	Somewhat unlikely	Somewhat likely	Very likely

23) How serious would it be if you missed work or class because you did not feel well after drinking alcohol?

Not Serious	Slightly Serious	Moderately Serious	Very Serious	Extremely Serious

24) How good or bad would it be if you missed work or class because you did not feel well after drinking alcohol?

Good	Somewhat Good	Neutral	Somewhat Bad	Bad

Please select the response that best applies to you.	No, Never	Yes, but not in the past 12 months	Once or more in the past year	How many times did it occur in the past year?
1. Have you drank so much alcohol in a short amount of time that you needed immediate professional medical care because of problems with consciousness, breathing, or upset stomach?				
2. Have you received professional medical care for an injury to your body that occurred after drinking alcohol?				
3. Have you not been able to remember what happened during part of or during the whole time when you were drinking?				
4. Have you experienced a headache, nausea, dizziness, or other physical symptoms the day after drinking alcohol?				
5. Have you engaged in sexual activity that you believe was risky to your health and/or safety after drinking alcohol?				
6. Have you felt sad or experienced low mood after drinking alcohol?				
7. Have you felt angry, hostile, or aggressive after drinking alcohol?				
8. Have you missed work or class because you did not feel well after drinking alcohol?				

Appendix G

PBB-HR

(ALCOHOL-REDUCTION AND ALCOHOL-SAFETY-AND-HEALTH STRATEGIES LISTED HERE)

Choose one strategy from the above list that you have not used in the past, but that you may use in the future to reduce bad outcomes from drinking alcohol.

List the strategy you chose here:_____

1) Type in one good thing that may come from using the strategy you listed above.
   _____
   _____

2) Type in another good thing that may come from engaging in the strategy you listed above.
   _____

3) Type in one thing that may get in the way of you using the strategy you listed above.
   _____
   _____

4) Type in another thing that may get in the way of you using the strategy you chose.
   _____

Appendix H

VHS

How important is it to you…

1) To be in good shape and to feel physically fit?

Not at all important	Somewhat important	Important	Very important

2) To feel you have plenty of energy for the way you'd like to live your life?

Not at all important	Somewhat important	Important	Very important

3) To know that your weight is right about where it should be?

Not at all important	Somewhat important	Important	Very important

4) To know that you have the endurance to participate in vigorous physical activities?

Not at all important	Somewhat important	Important	Very important

5) To stay in the best of health, whatever the reason?

Not at all important	Somewhat important	Important	Very important

Appendix I

YAAPST

Please check best response:

	No, Never	Yes, but not in the past 12 months	Once or more in the past year	How many times did it occur in the past year?
1. Have you driven a car when you knew you had too much to drink?				
2. Have you had a headache (hangover) the morning after you had been drinking?				
3. Have you felt very sick to your stomach or thrown up after drinking?				
4. Have you shown up late for work or school because of drinking, a hangover, or an illness caused by drinking?				
5. Have you not gone to work or school because of drinking, a hangover, or an illness caused by drinking?				
6. Have you gotten into physical fights when drinking?				
7. Have you ever gotten into trouble at work or school because of drinking?				
8. Have you ever been fired from a job or suspended or expelled from school because of your drinking?				
9. Have you damaged property, set off a false alarm, or other things like that after you had been drinking?				
10. Has your boyfriend/girlfriend (or spouse), parents, or other near relative ever complained to you about your drinking?				
11. Has your drinking ever created problems between you and your boyfriend /girlfriend (or spouse) or another near relative?				
12. Have you ever lost friends (including boyfriends or girlfriends) because of your drinking?				

13. Have you ever neglected your obligations, your family, your work or school work for two or more days in a row because of your drinking?				
14. Has drinking ever gotten you into sexual situations which you later regretted?				
15. Have you ever received a lower grade on an exam or paper than you should have because of your drinking?				
16. Have you ever been arrested for drunken driving, driving while intoxicated, or driving under the influence of alcohol?				
17. Have you ever been arrested, even for a few hours, because of other drinking behaviors?				
18. Have you ever awakened the morning after a good bit of drinking and found that you could not remember a part of the evening before?				
19. Have you ever had "the shakes" after stopping or cutting down on drinking (for example your hands shake so that your coffee cup rattles in the saucer or you have trouble lighting a cigarette?)				
20. Have you ever felt like you needed a drink just after you'd gotten up?				
21. Have you ever found that you needed larger amounts of alcohol to feel any effect, or that you could no longer get high or drunk on the amount that used to get you high or drunk?				
22. Have you ever felt that you needed alcohol or were dependent on alcohol?				
23. Have you ever felt guilty about your drinking?				
24. Has a doctor ever told you that your drinking was harming your health?				
25. Have you ever gone to anyone for help to control your drinking?				
26. Have you ever attended a meeting of Alcoholics Anonymous because of concern about your drinking?				
27. Have you ever sought professional help for your drinking? (For example, spoken to a physician, psychologist, psychiatrist, alcoholism counselor, clergyman about your drinking)				

Appendix J

CAPS-R

As a result of drinking alcoholic beverages during the last year, I have…

1) Engaged in unplanned sexual activity.

Never/almost never Rarely Sometimes/occasionally Often Very often

2) Drove under the influence.

Never/almost never Rarely Sometimes/occasionally Often Very often

3) Not used protection when engaging in sex.

Never/almost never Rarely Sometimes/occasionally Often Very often

4) Engaged in illegal activities associated with drug use.

Never/almost never Rarely Sometimes/occasionally Often Very often

5) Felt sad, blue, or depressed.

Never/almost never Rarely Sometimes/occasionally Often Very often

6) Felt nervous or irritable.

Never/almost never Rarely Sometimes/occasionally Often Very often

7) Felt bad about myself.

Never/almost never Rarely Sometimes/occasionally Often Very often

8) Had problems with appetite or sleep.

Never/almost never Rarely Sometimes/occasionally Often Very often

Appendix K

BACKGROUND INFORMATION

1) **Please check your gender:**
_____ Male
_____ Female

2) **How old are you? _____**

3) **Please indicate your ethnicity:**

- White/European American
- Asian-American/Pacific Islander
- Black/African American
- Native American/First Nation
- Latino(a)/Hispanic-American
- Other (please specify): _____

4) **In what college are you majoring?**

- Arts & Sciences
- Business Administration
- Health and Human Services
- Education and Human Development
- Technology
- Musical Arts
- I have majors in more than one college
- Undeclared
- I am not sure in which college my major is located

5) **What is your year in college?**

- Freshman
- Sophomore
- Junior
- Senior
- 5th year Senior or above

6) **Are you a:**

- Full-time student
- Part-time student

7) What is your GPA?

- Less than 2.0
- Between 2.0 and 2.99
- Between 3.0 and 3.49
- 3.5 or higher

8) **Are you employed?**

- No, I am not employed besides being a student
- Yes, I have a part-time job besides being a student (less than 40 hours per week)
- Yes, I have a full-time job besides being a student (at least 40 hours per week)

9) **Please indicate where you live:**

- I live on campus
- I live off campus

Please answer the following questions about ALCOHOL.

1) Have you consumed alcohol in the past four weeks?

- Yes
- No

2) How old were you when you had your first drink of alcohol?

Age: [ ]

3) How old were you the first time you were drunk? (If you have never been drunk, type in N/A)

Age: [ ]

4) **Have you been drunk in the past four weeks?**

- Yes
- No

5) **How many times in the past four weeks have you consumed 5 or more drinks in a row (if you are a man) or 4 or more drinks in a row (if you are a woman)?**

(Click here to choose) (response options from 0 to 28)

6) **On about how many days do you drink alcohol in a typical week when you are drinking?**

(Click here to choose) (response options from 0 to 7 days)

7) What beverage do you typically have when you drink alcohol?

- Only beer
- Only wine
- Only hard liquor (in shots or mixed drinks)
- A combination of beer, wine, and/or hard liquor

8) How many standard drinks do you consume on a typical day when you are drinking?

A standard drink = one 12-oz. beer
***or* one 4-to-5-oz. glass of wine**
***or* one 1 ½-oz. shot of hard liquor (either straight or in mixed drinks)**

(Click here to choose) (response options from 0 to 24 drinks)

9) **Choose the answer below that best describes the degree to which your use of alcohol is under your control:**

- Completely under my control
- Somewhat under my control
- Somewhat out of my control
- Completely out of my control

10) **Choose how easy or difficult it would be for you to go without drinking alcohol for the next month:**

- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

11) **What percentage of your friends drink alcohol?**

- 0% of my friends
- About 25% of my friends
- About 50% of my friends
- About 75% of my friends
- 100% or almost all of my friends also drink alcohol

Appendix L

INFORMED CONSENT & HUMAN SUBJECTS REVIEW BOARD APPROVAL

BGSU.
BOWLING GREEN STATE UNIVERSITY
Department of Psychology

INFORMED CONSENT

- You are invited to participate in an online study looking at behavioral strategies that college students use when they drink alcohol. This study is being conducted in the Psychology Department at BGSU, as part of a dissertation project.
- You are eligible to participate if you have consumed alcohol at least once in the past four weeks, are at least age 18, and are currently an undergraduate student at BGSU.
- Your participation will involve answering questions in an online survey about strategies you use while drinking alcohol, your drinking expectancies, outcomes from your drinking, your health views, and your drinking history and background information.
- The online survey will take 30 to 45 minutes to complete.
- The potential benefits of participating include helping better understand thoughts and behaviors of college students who drink alcohol. Furthermore, you may learn skills to drink more safely or to reduce your drinking, if you choose.
- The anticipated risks are that students may use behavioral drinking skills in ways that are not intended, such as to increase their drinking. However, I strongly encourage you to use strategies as intended, to promote safer and healthier drinking.
- Upon completion of the study, you can choose to either receive 1 extra credit point in your psychology course (for psychology courses offering research credit) ***or*** enter a drawing to win a gift card to your choice of either Amazon or Kroger. If you choose to enter the gift card drawing, you could win one of nine gift cards worth varying amounts (one gift card is worth $200, two gift cards are each worth $100, two gift cards are each worth $50, and four gift cards are each worth $25).
- Please note that if you are employed by BGSU and you win a gift card worth over $25, your name and the name of the study must be given to the university for tax purposes when you collect the gift card. Therefore, if you win, the university will know that you completed a study called "Harm Reduction Strategies."
- Your participation is completely voluntary and you are free to skip any questions you don't want to answer. In addition, you are free to change your mind and stop participating at any time.
- Deciding to participate or not ***will not*** impact your grades, class standing, or relationship to the university.
- In order to protect your confidentiality, your survey responses will be anonymous. Your name and email address will be collected in order to give you extra credit or to enter you into the gift card drawing. Your survey responses will not be linked to your name or email address as your identifying information will be collected on a separate server from your survey responses. Collected data and identifying information will be stored on a secure server and computer. Data will be presented in a manuscript, but no one person's answers will be presented - only a summary of data across all the participants.
- Do not leave the survey open if using a public computer or a computer others may have access to and remember to clear your browser cache and page history after completing the survey.
- If you have any questions about the study you may contact the Principal Investigator: Erica Hoffmann, M.A., Department of Psychology, Bowling Green State University, Office Phone: (419) 372-4499, Email: ehoffma@bgsu.edu
- You may also contact the Principal Investigator's advisor if you have any questions about this study: Harold Rosenberg, Ph.D., Bowling Green State University, Office Phone: (419) 372-7255, Email: hrosenb@bgsu.edu

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BGSU
Bowling Green State University

Office of Research Compliance
309A University Hall
Bowling Green, OH 43403-0183
Phone: (419) 372-7716
E-mail: hsrb@bgsu.edu

April 7, 2011

TO: Erica Hoffmann
Psychology

FROM: Hillary Harms, Ph.D.
HSRB Administrator

RE: HSRB Project #: H11D180GE7

TITLE: *Psychological factors associated with the use of alcohol harm reduction strategies*

The Human Subjects Review Board (HSRB) has reviewed the requested modifications you submitted for your project involving human subjects. Effective **April 7, 2011**, the following modifications have been approved:

Changing the number of gift cards available for compensation from 3 gift cards worth $50 to 2 gift cards worth $50.

You may proceed with subject recruitment and data collection.

The final approved version of the consent document(s) is attached. **The consent document(s) bearing the HSRB approval/expiration date stamp is the only valid version and, if it is a revision to previously approved document(s), supercedes those versions. Copies of the dated document(s) must be used in obtaining consent from research subjects.**

If you seek to make any additional changes in your project activities, complete the Request for Modifications/Addendum application and submit it to the HSRB via this office. Please notify me in writing upon completion of your project (or email: hsrb@bgsu.edu).

Good luck with your work. Let me know if this office or the HSRB can be of assistance as your project proceeds.

COMMENTS:
Please add text equivalent to the HSRB approval/expiration date stamp to the "footer" area of the electronic informed consent (see attached for specific text).

C: Dr. Harold Rosenberg

BGSU
Bowling Green State University

Office of Research Compliance
309A University Hall
Bowling Green, OH 43403-0183
Phone: (419) 372-7716
E-mail: hsrb@bgsu.edu

March 18, 2011

TO: Erica Hoffmann
Psychology

FROM: Hillary Harms, Ph.D.
HSRB Administrator

RE: HSRB Project No.: H11D180GE7

TITLE: *Psychological factors associated with the use of alcohol harm reduction strategies*

You have met the conditions for approval for your project involving human subjects. **As of March 18, 2011, your project has been granted final approval by the Human Subjects Review Board (HSRB). This approval expires on March 15, 2012.** You may proceed with subject recruitment and data collection.

The final approved version of the consent document(s) is attached. Consistent with federal OHRP guidance to IRBs, **the consent document(s) bearing the HSRB approval/expiration date stamp is the only valid version and you must use copies of the date-stamped document(s) in obtaining consent from research subjects.**

You are responsible to conduct the study as approved by the HSRB and to use only approved forms. If you seek to make any changes in your project activities or procedures, send a request for modifications to the HSRB via this office. Those changes must be approved by the HSRB prior to their implementation.

You have been approved to enroll 400 participants. If you want to enroll additional participants you must seek approval from the HSRB.

Good luck with your work. Let me know if this office or the HSRB can be of assistance as your project proceeds.

Comments/ Modifications:
Please add text equivalent to the HSRB approval/expiration date stamp to the "footer" area of the electronic informed consent (see attached for specific text).

c: Dr. Harold Rosenberg

Research Category: EXPEDITED #7