A Dissertation

entitled

Using the Integrated Behavioral Model to Predict

Binge Drinking among College Students

By

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The binge drinking rate among college students has remained relatively high (43%) for the first decade of 2000, indicating a pervasive behavior throughout U.S. college campuses. This behavior poses a consistent threat to the safety and health of college students. This public health issue urgently demands a remedy, and behavior scientists have proposed a number of theories to help explain it. Among these theories is the Integrated Behavioral Model (IBM), an extension of the Theory of Planned Behavior. The current study assessed the IBM’s ability to predict and explain binge drinking among college students. An extensive literature review, data obtained from focus groups, and operationalizing the constructs from the IBM led to the development of a survey instrument. The research design included a single-point, cross-sectional data collection method of 40 randomly chosen undergraduate classes offered during the summer of 2011. At a response rate of 89%, the participants included 356 individuals (52% female), 75% caucasian, with a mean age of 23. Thirty-seven percent reported they binge drank the last time they partied/socialized, while almost half experienced a negative consequence due to this behavior. The IBM explained approximately 43% of intentions and 26% of binge
drinking behavior and indicated that Caucasians (OR=6.51), Hispanics (OR=5.16), those who participated in intramural sports (OR=2.10), and college males (OR=1.32) binge drank at disproportionately high rates. A path analysis revealed three significant constructs ($p<0.05$) which predicted intentions to binge drink: Experiential Attitude (0.34), Injunctive Norms (0.23), and Self-Efficacy (-0.27). That is, students binge drink based on their affective expectations and their referent’s approval, though they believed strongly in their ability to moderate their drinking.

Prevention programs could include peer education to lessen alcohol expectancies, the use of opinion leaders (family members or high-profile figures) to help reduce binge drinking, and education of college students on refusal techniques and alcohol avoidance to increase self-efficacy. Although limited in its use thus far, the IBM shows promise in its application regarding binge drinking among college students. Future research should determine the efficacy of the IBM constructs which were found to be nonsignificant (IA, DN, and PC).
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Chapter 1

Introduction

Chapter One provides an overview of the scope of the problem surrounding alcohol use among U.S. college students and describes the college student population that was studied. It examines the prevalence rates from leading national surveys measuring alcohol consumption in this population and discusses the consequences associated with binge drinking. It then states the purpose of the study, research questions, hypotheses, definitions, delimitations, and limitations of the study.

1.1 Scope of Problem

There exists a significant association between binge drinking and college students. Binge drinking, commonly defined by Johnston and colleagues (2001) as “five or more drinks for a male or female in one sitting within the last two weeks” has remained relatively high at a rate around 43% for the first decade of 2000 (ACHA/NCHA, 2010; Core Institute, 2011; SAMHSA, 2011; Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002). Indeed, binge drinking on campuses across the United States has been a consistent threat to the safety and health of college students.
There are costs and consequences associated with binge drinking on college campuses throughout the United States. Assessing this significant problem is twofold. Institutional costs associated with binge drinking are one concern. External costs related to college students are another concern. For example, institutional costs linked to the university include costs due to attrition, counseling, property damage, student conduct/judicial affairs, and campus safety. Attrition costs include monetary loss due to student dropout from college (Outside the Classroom, 2010). External costs, include not only money, but the fundamental well-being of the individual who binge drinks or who has been affected by a binge drinker. Consequences such as death caused by unintentional injury and driving under the influence are examples of some problems college students endure (Hingson, Heeren, Winter, & Wechsler, 2005; Hingson, Zha, & Weitzman, 2009).

In addition to drinking and driving, researchers found a number of other undesirable consequences of increased amounts of alcohol consumed by college students. Among these was poor academic performance, attrition, and missing classes (Core Institute, 2011; Perkins, 2002). Likewise, there were increased incidents of assaults and rape (Hingson et al., 2009). Additionally, they found that women who attend universities with higher binge drinking rates were more likely to be sexually assaulted. Unfortunately the role of these consequences associated with binge drinking remained the same or increased throughout the early 2000s (Hingson et al., 2009). All of these consequences associated with a high binge drinking rate constitute a perfect storm of misfortune for these college students.
The National Institute on Alcohol Abuse and Alcoholism identifies binge drinking as a major concern to universities throughout the United States (Presley, Meilman, & Leichliter, 2002). This public health issue urgently demands a remedy, and behavior scientists have proposed a number of theories to help explain it. Among these theories is the Integrated Behavioral Model (IBM), an extension of the Theory of Planned Behavior. The IBM can be used to predict and explain why college students engage in binge drinking. Through better prediction of this behavior, prevention programs can be developed and as a result, consequences due to binge drinking can be curtailed.

1.2 College Student Population

The National Center for Education Statistics (NCES) is a national organization operating out of the U.S. Department of Education. It measures and reports data related to education. According to the U.S. Department of Education (2009), college student enrollment for degree-granting institutions increased over the past 10 years (1997-2007). Presently, 18.2 million people are enrolled in degree-granting institutions, an increase of 26%, or 3.7 million people in the past 10 years. In those same 10 years, full-time enrollment status increased by 34%, while part-time enrollment status increased only by 15% (U.S. Department of Education, 2009).

Of the 18.2 million currently enrolled undergraduate and graduate students, 65% or 11.3 million individuals are considered to be full-time students. Female (29%) enrollment increased more than male (22%) enrollment from 1997 to 2007. Females represented a larger portion (57%) of the college student population than did males (43%) (U.S. Department of Education, 2009).
According to NCES, the percentage of 18-24 year-olds who are currently enrolled in college has remained at the same level over the past 10 years at around 39%. Reviewing total undergraduate enrollment only, an increase of 25% has occurred from 1997 to 2007. Of the total 18.2 million currently enrolled college students, 86%, or 15.6 million are undergraduates. The racial/ethnic minority population of college students has also increased from 15% in 1976 to 32% in 2007 (U.S. Department of Education, 2009).

1.3 Prevalence of College Drinking

The American College Health Association (ACHA) uses the National College Health Assessment II (NCHA II) to track and collect data related to college students’ behaviors, perceptions, and habits (ACHA/NCHA II, 2010). ACHA publishes biannual results of these surveys, and identifies factors that affect the health of this population. As reported by the ACHA/NCHA II in 2010, the proportion of college students who consumed five or more alcoholic beverages (for men or women) the last time they partied was 42.8% for males and 27.1% for females, up from 41.1% and 24.8% respectively in 2008. Further, slightly more than one-fourth of males and one-fifth of females binge drank between one and two times within the past two weeks (ACHA/NCHA II, 2010).

According to the American College Health Association’s National College Health Assessment II (ACHA/NCHA II, 2010), two-thirds of college-aged males (66.3%) and slightly fewer females (64.8%) reported they used alcohol at least once in the month prior to the assessment, demonstrating an increase from the first publication of the survey in the fall of 2008. At that time, 64.8% of college-aged males and 62.4% of college-aged females consumed alcohol at least once in the month prior to the assessment.
(ACHA/NCHA, 2008). Heavy drinkers are considered those who consumed alcohol at least once for 10 to 29 days in the month prior to the assessment (ACHA/NCHA, 2010). As reported by ACHA/NCHA (2010), 17.3% of college-aged males and 12.6% of college-aged females were considered “heavy drinkers,” also showing an increase in use of alcohol since the 2008 published survey.

The ACHA/NCHA II survey also inquired about college student habits when consuming alcohol within the past 12 months. An overwhelming majority stated that they eat before or during drinking (73.1% males; 79.8% females), stayed with their friends the entire time they drank (77.4% males; 88.6% females), and used a designated driver when they consumed alcohol (75.4% males; 87.2% females). Eating before drinking alcohol constitutes a risk reduction strategy, since the food in the stomach slows the absorption rate of the alcohol; as a result, an individual will not get intoxicated as quickly. Staying with the same friends the entire evening and/or using a designated driver demonstrates good use of protective measures related to alcohol consumption.

These actions by college students show they want to be safe when they are drinking. However, a significant proportion of the student population fails to use harm reduction strategies when they “party,” and unnecessarily put themselves at risk for negative consequences due to alcohol consumption. As reported by ACHA/NCHA II (2010), the top three negative consequences suffered from alcohol consumption include the following: “did something you later regretted” (35.0% males, 34.5% females), “forgot where you were or what you did” (33.3% males, 30.0% females), and “had unprotected sex” (19.2% males, 16.1% females).
Another annual national study, the National Survey on Drug Use and Health (NSDUH), assesses drug and alcohol prevalence in people aged 12 and older. Published yearly by the Substance Abuse and Mental Health Services Administration (SAMHSA) in conjunction with the Research Triangle Institute (RTI) in North Carolina, it surveys over 65,000 households nationwide. In 2010, the survey reported that 48.9% of 18-20 year-olds and 70.0% of 21-25 year-olds consumed alcohol. The NSDUH defined binge-drinking as five or more drinks on the same occasion on at least one day in the past 30 days (Substance Abuse and Mental Health Services Administration, 2011). Of the 18-20 year-olds, 33.3% binge drank, while 45.5% of those aged 21-25 reported binge drinking at least once in the past month. The 21-25 age category was also the most likely age group to binge drink.

NSDUH reports specifically on college-aged students, as well. For young adults aged 18-22, the results showed that, full time college students reported consuming more alcohol (including binge drinking) than those not attending college. Sixty-three percent of college students and 52.4% of non-attending college-aged students reported using alcohol in the past month. Within the same age group, 42.2% of college and 35.6% of non-attending college-aged students reported binge drinking at least once in the past month (SAMHSA, 2011). NSDUH reports binge drinking percentages have remained constant since the 2002 results. In addition, data from the SAMHSA (2011) illustrates 69.1% of those who graduated from college consumed alcohol, while 36.9% of those with less than a high school education consumed alcohol. Conversely, those without a high school education reported higher rates of binge and heavy alcohol consumption than did those with a college education. To summarize, according to the NSDUH, college
students drink more and drink more often than their non-college attending counterparts. However, after graduating from college, they tend to drink less heavily than those who did not attend college.

The Core Alcohol and Drug Survey represents another national survey, coordinated by the Southern Illinois University – Core Institute (SIU/Core Institute). This survey measures perceptions, attitudes, and use of alcohol, tobacco, and other drugs at two- and four-year institutions (Core Institute, 2011). An executive summary for 2009 was published in November of 2011. In this document, the 30-day prevalence rate for alcohol consumed by college students was 68.3%. Core and ACHA use the same definition for binge drinking. Similar to the binge rate specified in the NSDUH, the results from the Core indicate 43.1% of the student population reports binge drinking within the last two weeks. However, the Core includes both two-year and four-year universities, whereas NSDUH only assesses fulltime college students at four-year institutions. Also reported in the Core survey were the negative experiences suffered by those who consumed alcohol or drugs. The top three included the following: unwanted sexual intercourse (78.1%), forced sexual touching or fondling (65.7%), and actual physical violence (56.7%).

The College Alcohol Study (CAS), conducted by Harvard University, assessed college students’ alcohol use at four-year colleges and universities. Four national assessments were performed from 1992 to 2006. During those 14 years, the 44% binge rate remained unchanged. This rate corroborates with other national assessments and the acknowledged or accepted binge drinking rate of around 44%, regardless of varying methodologies and sampling designs from other studies (O’Malley & Johnston, 2002;
Wechsler & Nelson, 2008). According to Wechsler and Nelson (2008), although the rate has remained constant, there has been a polarizing effect among abstainers and those who binge drink more frequently. Both of these groups have increased in size.

Wechsler and Nelson (2008) noted, because of these binge drinking rates, the students’ academic performance, health, social relationships, physical violence, and risk-taking behaviors have been affected. For example, a risk-taking behavior, such as having unprotected sex, has increased. Additionally, there is an association between college students who consume increased amounts of alcohol per week and obtaining lower grade averages (i.e., A, B, C, D, & E) (Presley, Meilman, Cashin, & Leichliter, 1997). Likewise, 33% of college students and 60% of frequent binge drinkers (defined as consuming five or more drinks three or more times during a two-week period) qualify as alcohol abusers, according to the Diagnostic and Statistical Manual of Mental Disorders IV-TR (APA, 2000)). Similarly, 6% of college students and 20% of frequent binge drinkers could be diagnosed for alcohol dependence (Knight, Wechsler, Kuo, Seibring, Weitzman, & Schuckit, 2002; Wechsler & Nelson, 2008).

Reasons cited for binge drinking among first-year college students include membership into a fraternity or sorority, drinking to “fit in,” low-cost, belief that their friends binge drink, and easy access to alcohol (Wechsler & Nelson, 2008). Community factors also influence a college student’s decision to binge drink, such as price discounting and promotions at local liquor establishments (Wechsler & Nelson, 2008). The researchers also pointed out it is easier to lower rates of binge drinking if the focus is shifted from the heaviest drinkers to the “drinking behavior of the majority.”
Researchers recommended incorporating social marketing strategies to limit alcohol consumption or use counter-advertising to increase awareness of problems associated with alcohol use and binge drinking (Glassman & Braun, 2010). Another solution to this problem includes the use of the ecological model when planning prevention programs which should include community-based prevention efforts. When developing prevention programs, community involvement is necessary; in addition, inclusion of neighborhoods, law enforcement, local bars, and clubs is also suggested (Wechsler & Nelson, 2008).

Although only performed once in 1995, the Centers for Disease Control (CDC) developed the National College Health Risk Behavior Survey (NCHRBS) to assess the health of college students at two- and four-year institutions. This assessment proved useful, as it documented and reported drinkers by race, age, and gender, whereas other national assessments did not. Assessing different populations is useful in developing prevention programs based on likes and dislikes, and helps with community outreach efforts. For example, among Caucasian students, 49.4% of males and 31.6% of females binge drank. Conversely, among African American students, only 22.8% of males and 6.1% of females binge drank, while among Hispanic students, 39.9% of males and 22.6% of females binge drank. There is not only a big discrepancy in binge drinking among races, but also between genders. As reported by the NCHRBS, while 48.7% of males binge drank, only 34.8% of females did so. However, much like NSDUH, ACHA/NCHA II, and even CAS, the overall binge rate for students at four-year universities was documented at 41.5% (CDC, 1997).
1.4 Consequences of Drinking

Alcohol consumption has deleterious effects on many college campuses across the United States. As previously noted, consequences suffered can be as simple as a hangover or as serious as suffering sexual assault, or even death. Additional consequences reported by college students include physically injuring another person or themselves, as well as seriously considering suicide (ACHA/NCHA, 2010). Furthermore, between 1999 and 2005, the number of college students who drove under the influence of alcohol increased (Hingson et al., 2005). Arrests and unintentional deaths related to alcohol consumption also increased in the past decade (Hingson et al., 2009). Costs associated with these consequences reach into the billions. Although research on these is not available, Miller and colleagues (2006) conducted research on the societal costs of underage drinking and estimated almost $62 billion dollars in total expenditures, of which quality of life costs accounted for two-thirds. This price tag is only for underage drinkers which, as research demonstrates, is a smaller population that that of college student drinkers.

Likewise, researcher found a direct correlation between lower GPAs and alcohol consumption. Presley and colleagues (1997) demonstrated as the frequency of alcohol consumption increases, their GPA falls accordingly. For example, it was reported that those who earned an “A” average only consumed around four drinks per week whereas those who consumed almost 10 drinks a week earned either “Ds” or “Fs.” Additionally, absenteeism and dropping out of school is a problem and a major ramification of college drinking (Core Institute, 2011; Perkins, 2002). Other researchers also performed studies assessing alcohol consumption and college students’ grades. They all revealed as college
students increased their alcohol consumption, their GPA declined (Singleton, 2009; Singleton & Wolfson, 2007).

1.5 Statement of Purpose

The purpose of the current study is to assess the Integrated Behavioral Model (IBM), and its ability to predict binge drinking among college students. As noted previously, binge drinking is defined as five or more alcoholic beverages for men or women (Johnston, O’Malley, & Bachman, 2001). Using this definition, multiple national assessments on college students corroborate the national binge rate for four-year colleges remains around 43%. Many articles described the importance of the development of prevention programs to decrease this rate. In addition, Glanz, Rimer, and Viswanath (2008) stressed the importance of using behavioral science theories as a guide in the development of program components.

Behavioral science theories help guide the development of prevention programs and have been used for years. This proposed research study will elicit responses as to why college students binge drink, based on the IBM (Montano & Kasprzyk, 2008). The IBM is an extended version of the Theory of Planned Behavior (TPB), and includes the following components that influence behavioral intention: the person’s Attitude (including Experiential and Instrumental Attitudes), Perceived Norm (including Injunctive and Descriptive Norms), and Personal Agency (including Perceived Control and Self-Efficacy). In turn, behavioral intention is hypothesized to help predict (or explain) one’s participation in or avoidance of a particular behavior.
The reason for using the IBM rather than the TPB is that the IBM includes more specified factors for predicting behavior than does the TPB. For example, past behavior is often a strong predictor of future behavior. However, past behavior is not a measured factor in the TPB. Likewise, the construct Perceived Behavioral Control (within the TPB) takes into account two separate measures: Self-Efficacy and Perceived Control that cause people to attempt behaviors. These two individual measures should not be combined within one construct (Perceived Behavioral Control) as the TPB does. Rather, these two components should be examined individually as delineated in the IBM. The IBM is more comprehensive in reviewing a particular behavior and the forces that act upon a person to participate in that behavior. The IBM will be used to predict and explain the binge drinking patterns among undergraduate college students, further validating its utility as a health behavior theory.

1.6 Hypotheses

Research Question 1:
How does the prevalence of binge drinking among college students differ by demographics?

1.1: There is no statistically significant difference in binge drinking by age groups (legal and non-legal drinkers).

1.2: There is no statistically significant difference in binge drinking by gender.

1.3: There is no statistically significant difference in binge drinking by race/ethnicity.

1.4: There is no statistically significant difference in binge drinking by class rank.
1.5: There is no statistically significant difference in binge drinking by those who play intramural sports.

1.6: There is no statistically significant difference in binge drinking by those affiliated with Greek membership.

1.7: There is not statistically significant difference in binge drinking by enrollment status.

Research Question 2:
What is the most prevalent consequence(s) college students experience from binge drinking?

2.1: Hangover is the most prevalent consequence college students experience from binge drinking.

Research Question 3:
How much variance in binge drinking does the Integrated Behavioral Model predict?

3.1: The IBM does not predict binge drinking among college students.

Research Question 4:
What constructs in the IBM (Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intention) are most predictive of binge drinking among college students?
4.1: There is no statistically significant difference between the constructs within the Integrated Behavioral Model in predicting binge drinking among college students.

Research Question 5:
Does the predictive validity of the Integrated Behavioral Model constructs differ by gender when predicting binge drinking among college students?

5.1: There is no difference in the predictive validity of the constructs of the IBM by gender of student.

Research Question 6:
Does the predictive validity of the Integrated Behavioral Model constructs differ by age (21 and over vs. under 21) when predicting binge drinking among college students?

6.1: There is no difference in the predictive validity of the constructs of the IBM by age of student.

Research Question 7:
Does the predictive validity of the Integrated Behavioral Model constructs differ by race/ethnicity when predicting binge drinking among college students?

7.1: There is no difference in the predictive validity of the constructs of the IBM by race/ethnicity of student.
Research Question 8:

Does the predictive validity of the Integrated Behavioral Model constructs differ by Greek status when predicting binge drinking among college students?

8.1: There is no difference in the predictive validity of the constructs of the IBM by Greek status of student.

Research Question 9:

Does the predictive validity of the Integrated Behavioral Model constructs differ by athletic status when predicting binge drinking among college students?

9.1: There is no difference in the predictive validity of the constructs of the IBM by athletic status of student.

Research Question 10:

What is the path model among the constructs within the Integrated Behavioral Model in explaining binge drinking among college students?

10.1: No significant coefficients exist within the path model to predict college students’ binge drinking based on the IBM constructs.

Research Question 11:

What is the path model among the constructs within the Integrated Behavioral Model in explaining alcohol related consequences among college students?

11.1: No significant coefficients exist within the path model to predict college students’ alcohol related consequences based on the IBM constructs.
Research Question 12:

What is the path model among the concepts within the Integrated Behavioral Model in explaining the binge drinking among college students?

12.1: No significant coefficients exist within the path model to predict college students’ binge drinking based on the IBM concepts.

1.7 Definition of Terms

*Abuse of Alcohol* - consuming more than the recommended amount of beer, wine, or liquor in one setting

*Alcohol* - one 12oz. beer; 1.5oz. shot of hard liquor; or 4 oz. cocktail

*Attitude* - The degree to which performance of the behavior is positively or negatively valued (Montano and Kasprzyk, 2008).

*Behavior* - what a person does, what their actions are.

*Behavioral Intention* - A construct within the Integrated Behavioral Model. The perceived relationship between an individual and a behavior. Behavioral intention is determined by the Attitude, Perceived Norm, and Personal Agency.

*Binge drinking* - consumption of 5 or more alcoholic beverages for men or women in the previous two weeks.

*Descriptive Norms* – what a person’s referents around them are performing

*Episodic heavy drinking* - defined as 5+ drinks for men and 4+ drinks for women on at least one day in the past year

*Frequent binge drinkers* – three or more binge drinking episodes within the past two weeks.
High-risk drinking - see binge drinking

Injunctive Norm – a referents belief about a particular behavior.

Instrumental Attitude – a person’s beliefs about the outcome of a particular behavior.

Integrated Behavioral Model- A model expanded upon from the TPB which theoretically provides more precision in predicting a particular behavior.

Majority - greater than 50% of the population

Personal Agency - A construct of the IBM. This construct involves a person’s self-efficacy and their perceived control of the environment around them.

Self-Efficacy - a person’s belief in their ability to perform or avoid a particular behavior.

Theory of Planned Behavior - a behavioral science theory used to predict individuals behavior. This theory incorporates four primary constructs: Attitude Towards Behavior, Subjective Norm, & Perceived Behavioral Control, which will predict behavioral intention, which in turn, predict behavior.

Underclassmen - grouping of undergraduate freshmen and sophomores

Undergraduates - Classification of students from freshman to seniors

Upper Classman - grouping of undergraduate juniors and seniors

Use of Alcohol – consumption of at least one beer, wine or hard liquor in one setting

1.8 Delimitations

Due to the nature of this research project, the external validity may be compromised and therefore generalizability to a larger campus population may not be valid. Since this study is delimited to one large-sized state university in Northwest Ohio, the results may not be generalizable to undergraduate college students in other parts of
the United States or in private universities. Likewise, this research project is using only one of the numerous behavioral science theories commonly used to assess behaviors. Thus, other models or components may be more robust predictors of high-risk drinking with college students. Also, the targeted population in this study is delimited to only undergraduate college students. Thus, the data may not be valid for graduate students or non-college students of a similar age.

1.9 Limitations

A potential limitation of this study involves the response rate. The further the response rate is from 100%, the more likely the external validity of this study is to be compromised. The effect of recall bias on self-reported data is an additional limitation. Because of this bias, data could be under- or over-reported. If this occurs, this would affect the internal validity of the findings. Moreover, there is a chance that some students may have given socially desirable responses. Another potential limitation includes the closed format (monothematic) design of the questionnaire items, such that the respondent can only answer the question with the responses given. Other limitations include the survey given in classrooms and students may feel that confidentiality was compromised as well as the time of data collection. This occurred in the summer, when most other studies using college students occurs in either the Fall or Spring semester. It is beyond the scope of this study to elicit other items or more qualitative data pertaining to the questions. To the extent that important items are missing, it would be a threat to the internal validity of the findings.
1.10 Summary

Chapter One describes the extent of the problem of binge drinking among U.S. undergraduate college students and describes the population that was studied. It presents multiple national surveys used to assess binge drinking, including such national assessments as the ACHA/NCHA, NSDUH, and CAS. The chapter also discusses some consequences related to binge drinking. It then states the purpose of the study as well as the research questions and hypotheses. It concludes by discussing the delimitations and limitations of the study.
Chapter 2

Literature Review

This chapter consists of a review of alcohol related morbidity and mortality, as well as an overview of the Healthy People 2020/Healthy Campus 2010 goals for this public health challenge. Additionally, a description of the evolution of the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), and the Integrated Behavioral Model are provided. The chapter concludes with a synopsis of the research utilizing the TRA/TPB/IBM specifically related to high-risk drinking among college students.

2.1 Health and Psychological Effects of Alcohol Misuse

College students who engage in high-risk drinking are at an increased risk for experiencing negative health outcomes. Results from the ACHA/NCHA II revealed the top three negative consequences reported by college students consisted of later regretting something they did (35% for males; 33% for females), forgetting where they were or what they did (32% for males; 28% for females) and physically injuring themselves (18% for males; 15% for females). Moreover, 150,000 students developed health problems related to alcohol from 1998-2001 (Hingson et al., 2005). Other consequences suffered
from consuming too much alcohol included deaths, injuries, assaults, sexual abuse, unsafe sex, academic and family problems (ACHA/NCHA, 2008).

Morbidity and mortality due to excessive alcohol consumption among college students are frequent occurrences. The latest data showing a trend in morbidity and mortality was published in 2009 by Hingson and colleagues, reviewing data and comparing rates from 1998 to 2002 and then through 2005. These data were obtained from many resources and national databases, including the NSDUH study of college versus non-college students, ages 18-24, the National Highway Traffic Safety Administration Fatality Analysis Reporting System, National Coroner Studies, Centers for Disease Control and Prevention Injury Mortality Data, and the Harvard College Alcohol Study. Numerous other researchers also contributed to the literature by providing statistics related to alcohol consumption among college students and the deleterious consequences.

2.1.1 Drinking and Driving

Between 1998-2005, a statistically significant increase in the prevalence of driving under the influence of alcohol for college students occurred (Hingson et al., 2005; Hingson et al., 2009). Indeed, the rates went from 26.5% (in 1999) to 31.4% (in 2002), and finally 28.9% (in 2005) (Hingson et. al., 2005; Hingson et. al., 2009). According to ACHA/NCHA II (2008), 25.2% of those respondents reported driving after consuming any type of alcohol in the last 30 days. Another study, assessing drinking and driving, documented nearly 65% of the respondents admitting to driving a car after consuming
alcohol while a little over 50% of those knew they were intoxicated when driving a car (Ausherman, Black, Rafiroiu, and Kandakai, 2006).

2.1.2 Traffic and Nontraffic Related Deaths

In 1999, the rate for alcohol-related traffic deaths among college students occurred at 14.5 per 100,000. Hingson and colleagues (2009) demonstrated that, although an increase occurred in alcohol-related driving deaths among college students in 2002 (15.2 per 100,000), this rate then declined to 14.1 per 100,000 population in 2005 (Hingson et al., 2009). Conversely, the rate occurring from alcohol related unintentional nontraffic deaths for all 18 through 24 year old college students increased from 1999-2005. The rate for unintended, nontraffic deaths changed from 2.9 per 100,000 college students in 1999 to 4.9 per 100,000 college students in 2005. This yielded a 25.6% positive increase [RR = 1.23, 95% C.I.: 1.07-1.42]. Lastly, when combining all groups 18-24 years of age regardless of college status, a modest, yet statistically significant 12% increase in alcohol-related unintentional injury deaths occurred [RR=1.05 (95% C.I. 1.01, 1.09)].

2.1.3 Arrests and Injuries

According to Mundt, Zakletksaia, and Fleming (2009), they researched extreme college drinkers and the risk they pose to those around them. The research data showed men who consumed eight or more drinks per occasion had a 19% increased chance of suffering an injury, while women who consumed five or more drinks had a 10% greater
chance of suffering an injury. Their chance increased for every day they consumed 8+ drinks for men and 5+ drinks for women per day.

Among those injured, 1,700 college student deaths occurred including unintentional injuries and deaths related to motor vehicle accidents. Hingson and colleagues (2009) determined 599,000 alcohol related injuries occurred every year; however no significant change occurred in injuries during that same period (1999-2005). Alcohol related arrests for those seeking or receiving treatment due to alcohol or other drug problems also statistically significantly increased [RR=1.33 (95% C.I. 1.22, 2.01)] (Hingson et al., 2005; Hingson et al., 2009).

2.1.4 Suicide

Suicide represents another serious alcohol related consequence for college students. A strong association between suicidal behavior and those who exhibit a pattern of binge drinking exists (Schaffer, Jeglic, & Stanley, 2008). Underage college drinkers who binge drink are at particularly high-risk (Gonzalez, Bradizza, & Collins, 2009). For example, between 1.2% and 1.5% of students acknowledged their attempt at suicide at least once in the previous year due to drug or alcohol use (Presley, Leichliter, & Meilman, 1999). Their results suggested an association between alcohol use, suicidal ideation, and the reason individuals use alcohol – to escape or regulate the pain associated with the thought of suicide or with the problems they are confronting in their lives (Gonzalez, Bradizza, & Collins, 2009).
2.1.5 Sexually Related Acts

Sexual acts and violence associated with alcohol consumption are prevalent on many college campuses. Sexual acts include college students who have unprotected sex. In Hingson and colleagues’ article (2005), these authors reported over 400,000 (8%) college students participated in unprotected sex annually. Furthermore, Perkins (2002) reported 25% of college students admitted to having unprotected or unintended sex in the previous year when alcohol was consumed. A study by Patrick and Maggs (2009), showed a significant trend between the amount of alcohol consumed and sexual activity. For instance, the more alcohol consumed the more likely college students to participate in unprotected sex. No significant changes occurred in unprotected sexual intercourse, alcohol-related sexual assault, or victims of date rape over the past decade which Hingson (2009) attributes to the increase in population rates of college students proportionate to the increase in incidences.

Likewise, sexual violence associated with alcohol consumption is also prevalent on many college campuses. Sexual violence includes those who were previously assaulted or raped. Almost 700,000 assaults and close to 100,000 occurrences of sexual abuse (sexual-related assault or date rape) resulted from students who binge drank from 1998-2001 (Hingson et al, 2005). Abbey (2002) further demonstrated almost 50% of all college females are involved in sexual assault acts. In fact, it has been shown women who attend colleges that have greater binge drinking rates are more likely to be sexually assaulted (including sexual coercion, rape, and victimization) (Benson, Gohm, & Gross, 2007; Kuo, Dowdall, Koss, & Wechsler, 2004). Similarly, as the amount of alcohol consumed increases, so does the severity of the assault (Abbey, Clinton-Sherrod,
McAuslan, Zawacki, & Buck, 2003). A similar article demonstrated out of 314 reported sexual assaults, 96% involved alcohol consumption prior to the assault. The authors reiterated what previous research has shown which includes sexual assaults occur more frequently than forcible assaults, and that alcohol is a key factor involved in this problem (Lawyer, Resnick, Bakanic, Burkett, & Kilpatrick, 2010).

2.1.6 Academic Problems

Academic problems related to alcohol abuse occurred in 25% of college students including flunking out, poor attendance, poor test grades, and falling behind in their class work (Engs, Deibold, & Hansen, 1996; Presley, Meilman, & Cashin, 1996; Presley, Meilman, Cashin, & Lyerla, 1996; Wechsler et al., 2002). Martinez and colleagues (2008) attempted to correlate heavy drinking and attrition from college. The results indicated no significance between the two until the researchers controlled for event attendance (the number of parties or gatherings they attended throughout the semester). Controlling for this variable they found heavy drinking predicted attrition at this university (Martinez, Sher, & Wood, 2008). This research demonstrates the importance of decreasing the amount of heavy drinking at that university, but more research is needed for better external validity and generalizability to all universities in the United States.

Vandalism and altercations with the police represent other occurrences related to binge drinking. According to Wechsler and colleagues (2002), vandalism takes place in 11% of college students who were under the influence. These same authors also reported 5% of college students under the influence had problems with campus security or were
arrested by the police for illegal acts. Hingson et al., (2002) reported 110,000 students were arrested for alcohol-related activities from 1998-1999.

Alcohol abuse can, over time, lead to dependence. According to a self-reported survey in 2001, 31% of college students met criteria for alcohol abuse while 6% met the criteria for a diagnosis of alcohol dependence according to the American Psychiatric Association’s Diagnostic and Statistical Manual for Mental Disorders (APA-DSM 4th Ed.) (Knight et al., 2002).

2.2 Effects of Alcohol on the Body

Alcohol causes harm to the human body. While excessive alcohol use is associated with negative outcomes to the body, no benefits to heavy alcohol use occur. Physiologically, alcohol causes chronic diseases, cancer, liver disorders, and heart disease (Hart, Ksir, & Ray, 2009). Liver diseases, such as cirrhosis of the liver, hepatitis, and fatty liver disease can all be caused by excessive alcohol consumption. Additionally, along with affecting the liver in various ways, alcohol also affects the heart. This is done by increasing the strength of contractions due to the increased blood pressure caused by too much alcohol consumption (Hart et al, 2009). Over time, this can lead to permanent hypertension (increased blood pressure) and cause the heart to work harder to pump the blood out into the vasculature. This can lead to coronary heart disease, which in turn can lead to a heart attack or stroke.

Another problem involves the brain and its development. Studies show a person’s brain still develops, even into a person’s mid 20’s (Hart, et al., 2009; Sokolow & McCardell, 2008). Alcohol can also impede the development of the brain when
adolescents consume too much alcohol or start drinking at such an early age. Alcohol also affects the brain by temporarily causing blurred vision and slurred speech (NIAAA, 2004b). Additionally, NIAAA (2004b) reports the brain is susceptible to memory slips (short-term effects) or more permanent conditions that require the need for custodial care due to permanent memory loss and/or the ability to not take care of one’s self.

Cancer from alcohol primarily occurs in the mouth, tongue, larynx, esophagus, pharynx, liver, stomach, pancreas, rectum, and colon (Hart et al., 2009). Nutritional deficiencies, induction of enzymes that activate other carcinogens, direct tissue irritation may cause cancer. Moreover, researchers suspect suppression of the immune system by alcohol use can cause other problems to occur. Smoking and alcohol combined together increase the likelihood for cancers of the pharynx, larynx, and the oral cavity (Hart et al., 2009).

2.3 Healthy People 2020

*Healthy People 2020* is a comprehensive document developed by a variety of experts to decrease health disparities and increase the health of the citizens of the United States. The original title of Health People 2000 (Priority Area 4) was “Substance Abuse: Alcohol and Other Drugs.” More specifically, priority area 4.7 of “Substance Abuse: Alcohol and Other Drugs” goal was to decrease “heavy drinking in past 2 weeks” for college students (HP, 2010). The final review published for Healthy People 2000 demonstrated that, although the goal was not attained for this priority area, it did decrease the proportion of those who binge drank in the past two weeks. The goal of this objective was to decrease the proportion of college students who binge drank in the past two weeks.
down to 32% among all college students. Unfortunately, binge drinking in the college population still occurs at high rates. According to the 1999 data from *Healthy People 2000*, the current rate at that time was 40.0% (HP, 2000). Baseline for this objective (in 1989) was 41.7%, thereby demonstrating a failed objective.

The release of *Healthy People 2010* signified another attempt to decrease binge drinking among college students. Unfortunately, HP 2010’s target goal of 20% of all college students engaging in binge drinking during the past 2 weeks (HP 2010, 2005) was not achieved, as demonstrated by the midterm report. Midterm results showed no change in binge drinker rates among college students from 2000. The original 1998 baseline used by HP 2010 for “Reduction in Students Engaging in Binge Drinking during the Past 2 Weeks” was at 39%. Although no change occurred at the midterm review, the goal of decreasing binge drinking among college students by almost 50% did not change.

According to Healthy People 2000 and 2010, at baseline in the year 1989, 41.7% of all college students binge drank in the past two weeks. In 1998, 38.9% of all college students binge drank in the past two weeks, and as of 2005 (according to *Healthy People 2010*), 38% of college students binge drank. Curiously, the *Healthy People 2000* goal of decreasing the binge drinking rate among college students by 10% was not met, yet the next version of Healthy People, set the lofty goal of decreasing binge drinking among college students by 20%.

Healthy People 2020, the latest version of this all inclusive document, used the Monitoring the Future’s report of 40% of college students who binge drank at least once in the past two weeks, as a baseline. HP 2020’s new targeted goal is to decrease this rate
to 36%, a decrease of 10%, or, a 10% improvement in the binge drinking rate. This goal seems more appropriate more achievable then past goals delineated in this document.

The American College Health Association (ACHA) has their version of Healthy People 2020, entitled Healthy Campus 2010. This document is a “companion document” of Health People 2020 and provides the framework for maintaining college students healthy and safe. It also provides benchmarks to meet certain objectives and can help universities establish future health plans to improve or maintain college student’s health (ACHA, 2011). ACHA uses 10 leading health indicators of which substance abuse is listed as the fourth leading indicator for change. The goal to limit or prevent binge drinking from occurring will help achieve one of Healthy Campus’ 2010 goals.

2.4 Behavioral Science Theory

2.4.1 Theory of Reasoned Action

Behavioral science theories are used to explain and predict why people perform a particular behavior. Some theories have been available and used over 50 years while new ones are continually being developed. Behavioral science theories are used in many fields of study, including human sexuality, smoking cessation, and high-risk drinking. The Theory of Reasoned Action (TRA) is one such behavioral science theory. This theory was developed by Fishbein and Ajzen in 1975. They distinguished differences between attitudes, belief, with intention serving as the most important determinant of behavior (Fishbein & Ajzen, 1975).

The Theory of Reasoned Action (TRA) states that the performed behavior is a direct result of the intention to perform a particular behavior when a person considers
their personal Attitude Towards the Behavior (ATB) and the peer pressure found around them (Subjective Norms). This theory (TRA) assumes total volitional control on part of the individual. Montano & Kasprzyk (2008) define volitional control as a person having influence, command, and interest in their behavior. However, volitional control is not always possible, and indeed plays a significant role in behavioral intention. The less volitional control a person exhibits, the weaker the TRA becomes in predicting a behavior.

There are four constructs within the TRA (see figure 2.1 for TPB constructs). The first construct, the Attitude Towards the Behavior (ATB), explains the individual’s attitude for either participating in or avoidance of a particular behavior. The ATB is a direct measurement using one question on a seven-point Likert-type scale with several different anchors. Conversely, Behavioral Beliefs (an indirect measurement of the respondent’s attitude) consists of the individuals beliefs towards a particular behavior coupled with their evaluation of the behavior (whether a benefit will arise from performing a particular behavior).

The second construct, Subjective Norms (SN), explains the beliefs of the participant when considering the thoughts and beliefs of their friends and family. This is a direct measurement and similar to peer pressure. Normative Beliefs, an indirect measurement, is based on their referent’s beliefs about the behavior coupled with the motivation the individual has in complying with their referent’s beliefs. A referent is defined as a family member, friend, or significant other in their life that is important to them (Fishbein & Ajzen, 1975). These referents are what people base part of their behavioral intention on, according to the TPB. Does the individual, after knowing the
referent’s belief, comply with their wishes and abstain from doing it, or do they disregard and go against their referent’s beliefs. In other words, people can be motivated by approval of key referents in their lives.

The third construct included in this theory is the Behavioral Intention (BI). The combination of the ATB and SN constructs help predict, the intention to perform the behavior, while BI directly relates to the actual performance of a behavior. Intentions represent a person’s conscious decision to engage in and perform the behavior. Behavioral Intention consistently ranks as one of the strongest predictors of behavior.

2.4.2 Theory of Planned Behavior

The Theory of Planned Behavior (TPB) as it is currently known is an extension of the Theory of Reasoned Action (McKenzie et al., 2009). By adding one construct – Perceived Behavioral Control (PBC), the theory’s name was changed from the TRA to the TPB. The TPB includes external forces which may facilitate or impede the performance of behavior. Bandura (1977) equates the PBC construct to self-efficacy. Self-efficacy is defined as the belief one has in their ability to accomplish a given task, and overcoming those obstacles that could prevent them from performing a certain behavior (McAlister, Perry, & Parcel, 2009; Viswanath, 2009). A person with strong self-efficacy can overcome these outside factors that can affect their performance of a behavior. Ajzen (2006) equates PBC to the control one has over the environmental factors influencing their participation in a behavior. The PBC measures how effective the respondent is able to control the environmental and outside factors that act on and influence their behavior.
Perceived Behavioral Control (PBC) affects not only the intention to perform a behavior, but also the behavior itself. ATB and SN assume the participant has total volitional control over the behavior. PBC takes into account situations where one is not under volitional control, and in fact, is controlled by outside factors (Montano & Kasprzyk, 2008). Likewise, ATB and SN measure and explain or predict Behavioral Intention. The PBC is actually made up of two concepts, intrinsic factors which are determined by that participant’s self-efficacy, and extrinsic factors, which are factors outside their control. Those are typically environmental factors, or the factors external to an individual that are out of their volitional control.

Perceived Behavioral Control (PBC) was added to the TPB to account for environmental and external factors that influence behavior. PBC is directly measured, assessing and individual’s confidence and perceived difficulty in performing a particular behavior (Ajzen, 2006; Bensley & Brookins-Fisher, 2009). Control beliefs are measured indirectly, measuring the individual’s belief in the presence or absence of obstacles and facilitators to perform the behavior while perceived power is the belief in overcoming the obstacles and either participation in or avoidance of a behavior.

The indirect measures (Behavior Beliefs, Normative Beliefs, and Control Beliefs) serve a couple of purposes in this behavioral science theory. Directly measured constructs (ATB, SN, and PBC) demonstrate and measure the participant’s likelihood of performing a behavior based on the respective constructs. The indirect measures, alternatively, help explain why the participant may or may not perform a behavior. In addition, responses to these measures help provide the basis for program development (Montano & Kasprzyk, 2008).
2.4.3 TRA/TPB and Alcohol Use among College Students

Multiple articles have demonstrated the effectiveness of the Theory of Planned Behavior (TPB) as a planning model and developmental tool for prevention programs (Johnston & White, 2003; Norman & Conner, 2006). In a meta-analytic review of over 130 articles using the Theory of Planned Behavior, on average, the TPB helped explain 39% of the variance in Behavioral Intention (ATB, SN, and PBC) and 27% of the variance in behavior (BI and PBC) (Armitage and Conner, 2001). However, the results of this study were not delineated by explicit health behaviors. In other words, this article was not specific to high-risk drinking among college students, rather a variety of health topics and populations were included. Armitage and Conner (2001) also deducted that across all behaviors the TPB was applied to, SN were the weakest of all predictors of intentions. Conversely, almost all research using the TPB showed Attitude Towards the Behavior (ATB) as the strongest predictor of behavioral intentions.

Researchers Hutchting et al., (2008) applied the Theory of Planned Behavior to explain alcohol behavior consumption patterns among sorority members at a university on the west coast. Their goal was to assess the TPB and binge drinking using a prospective research design at time one, then again one month later to assess the predictability of the TPB. In their sample, unlike other studies, SN had the highest correlation coefficient for predicting intentions to consume alcohol. This suggests peer influences are more important than the attitude one has towards the behavior. Referents had a stronger influence on their intentions – more so than their personal attitudes towards binge drinking. On the contrary, PBC was not found significant for predicting
intentions, but was found significant for predicting the behavior. Interestingly, when the researchers reanalyzed the path analysis, dropping the PBC, the results demonstrated a good fit, however when they compared path 1 (with PBC on intentions) to path 2 (without PBC on intentions), there was no statistically significant difference. This demonstrates the lack of effect PBC has on intentions to consume alcohol in this study.

While the PBC did not significantly predict intentions, it did predict the behavior. This reveals that although external factors may not contribute to changing intentions to consume alcohol, environmental factors and self-efficacy influence behavior. At this point, volitional control is not lost on the behavioral intention, but some volition is lost when performing the behavior. The authors suggest examining and assessing the role of “previous drinking behaviors” to increase and clarify the strength of intentions of drinking on the actual drinking behavior.

In a study performed in the UK, Hassan and Shiu (2007) assessed Low-Risk Single-Occasion Drinking (LSROD) with the predictive power of the TPB. LSROD is defined as no more than 3 units of alcohol per day for men and 2 units of alcohol per day for woman. Similar to the findings by Huchting et al., (2008), Hassan and Shiu (2007) surmised that because of the relative high PBC reporting (i.e., no loss of control over their surroundings) among both sexes in their convenience sample, PBC had a non-significant effect on behavioral intention. This means the students are under volitional control of their own intended behavior. The authors then used a hierarchical regression analysis controlling for ATB, SN, and PBC. Ultimately, without PBC affecting behavioral intention, the researchers surmised the TRA as a better predictor of intentions in this population rather than the TPB. Further, the TPB carried more predictive power
with males (34%) over females (24%). Also of significance in this study, and consistent with Hutching et al., (2008), the most predictive construct within the TPB for behavioral intentions in males are attitudes (12% unique contribution) and in females are SN (5% unique contribution) (Hassan and Shiu, 2007). These results indicate prevention programs, in this example, should differ by sex. Although these authors assessed gender, they did not further assess age or race/ethnicity. Their Cronbach’s alpha levels ranged from 0.63 (SN) to 0.90 (ATB). These low alpha scores could also represent a weak question(s) in their survey which compromise the strength of their results.

Researchers continue to strive to increase the amount of variance this theory explains in predicting alcohol use among college students by adding additional constructs to the model such as descriptive norms, alcohol expectancies, injunctive as well as subjective norms, and self-efficacy (as a separate construct from PBC). However, the parsimony of the TPB is disrupted when the original theory is expanded to include these constructs. Nevertheless, a variety of articles exist assessing these different components in conjunction with the TPB, in an attempt to increase predictability within this theory.

For example, Wall, Hinson, and McKee (1998) used the TPB and alcohol outcome expectancies as another concept to help intensify the predictive power of this theory. They also assessed ATB and alcohol outcome expectancies as two separate constructs. As noted, the authors reported these two concepts as “empirically distinguishable” (pg. 414) through their research. They reported that although these two concepts are not the same, alcohol outcome expectancies (AOE) can be considered a mediating factor. In other words, alcohol outcome expectancies operated through the ATB construct to enhance the predictive power of the TPB, without AOE, ATB was not
as strong a predictor. Results showed the intention to engage in behaviors are strengthened when AOE were added to the analysis and this increases the predictive power of the TPB. The authors go on to describe proximal predictors as gender specific, with greater predictive power among males over females. This shows that men place greater emphasis on AOE than women; however, women are more likely to consume increased amounts due to the “sociability” factor. However, a few noteworthy limitations existed in this study. For example, the researchers used a convenience sample of students from 1st year psychology classes which may not be representative of the student body or generalizable to university students at other schools. Additionally, the Cronbach’s alpha scores were “unacceptably” low (as mentioned by the researchers). Lastly, PBC was a non-significant predictor of intentions in both genders.

Injunctive and Descriptive Norms are two separate constructs. Injunctive Norms (IN) measures the beliefs or expectations “others” have regarding a particular behavior. In essence, Injunctive Norms can also be considered peer pressure. Descriptive Norms (DN), conversely, describe to what extent a referent participates in a particular behavior. Thus, this construct is used to assess the percentage of people participate in a given behavior, such as binge drinking.

In a related study conducted in the United Kingdom, researchers assessed the TPB and college student’s intentions to use alcohol. McMillan & Conner (2003) measured student’s self-reported intentions at time one and used self-reported data at time two, six months later. However, a 70% attrition rate occurred in this study. According to McMillian and Conner, the TPB explained 16.7% of the variance in their intentions to consume alcohol, which is low when compared to other research studies (Johnson and
White, 2003; Norman and Conner, 2006). Likewise, their alpha scores for reliability were reported in only two constructs, of which DN = 0.57.

After adding descriptive and moral norms, above and beyond the TPB constructs, descriptive norms resulted in a statistically significant change ($R^2\Delta=0.011; p<0.05$). In other words, a one-percent increase in variance occurred related to the addition of DNs. This illustrates that referents close to the individual participate in this behavior, and because of this, the individual will also perform that behavior. Nevertheless, moral norms did not predict alcohol use while PBC and Intentions were both found statistically significant over the 6-month period. Regrettably, the researchers only measured descriptive norms based on their best friend or partner while omitting family members. Individual assessment of each descriptive norm (significant other, family member and friend) could have been an interesting comparison to observe which norm increased the variance the most. In addition to descriptive norms, they only measured if the student used alcohol on a nominal scale of either yes or no. They did not measure how many times they did this or how much they consumed per sitting. This could impact the respondents’ intentions based on what their friend or partners intentions were. Since McMillan and Conner (2003) also found moral norms not to be significant predictor of behavioral intentions, indicating, perhaps, that college students do not take into account their moral belief when deciding to consume alcohol. These authors also attempted to measure past behavior and the prediction of future behavior; however they experienced multicollinearity and therefore could not include the results they obtained.

A study performed by researchers from Michigan State assessed Subjective Norms and then compared it with local university Injunctive and Descriptive Norms
versus U.S. Injunctive and Descriptive Norms (Park, Klein, Smith, & Martell, 2009). Although unique constructs in their own right, these authors wanted to evaluate the relationship between U.S. and university Injunctive and Descriptive Norms in limiting the number of alcoholic beverages consumed to 1-4 per session. After performing statistical analysis on over 1,100 undergraduates, only U.S. Descriptive and Injunctive norms were significant predictors of Behavioral Intentions. The researchers then reanalyzed their data including the TPB. Comparing Subjective Norms against U.S. and university Norms, Subjective Norms were a better predictor of Behavioral Intentions then either U.S. or university Descriptive or Injunctive Norms. However, these researches discovered that in their sample, university Descriptive and Injunctive norms interacted with PBC and ATB constructs, in effect acting as a mediating factor.

Park et al., (2009) demonstrated in their study, SN was the strongest predictor of BI, which is inconsistent with Armitage and Conner’s (2001) findings. An explanation for this unexpected result could be the unusual research question involved in the study, which was measuring the intention to consume less alcohol, not more alcohol. An interpretation for these results could include those who want to consume less alcohol, SN are better predictors of intentions rather than PBC and ATB (which are better predictors if one wants to consume more alcohol), which Norman et al, (1998) agree. Park, Klein, and authors (2009) also cite proximal friendships (those closest to the students) as more influential referents than distal friendships (students at this particular university). However, the authors did not provide information regarding the validity of their survey and used a convenience sample, perhaps compromising their results.
Johnston and White (2003) assessed the TPB and binge drinking and included group norms as another factor affecting the TPB. However, in this study, they substituted self-efficacy for PBC which Ajzen (2006) defines as a core component of the PBC. As noted by these authors, SN measures the beliefs of participant’s referents. SN does not, however, measure the strength of the referent. Indirect measures of SN measure both the belief and the participant’s motivation comply with that referent’s belief. Johnston and White (2003) hypothesized that measuring the strength of a referent will be more predictive of binge drinking than of SN alone. The researchers measured in-group as well as group-identification. However, they did not ask about the relationship between respondent and parents or significant others, only about friends – another missed opportunity to determine the relationship between family members approval and behavioral intention related to high-risk drinking. Next, they ran two hierarchical regression analyses – one using the TPB – another with TPB plus their new normative component. All the constructs, ATB, SN, and SE accounted for 69% of the variance. The intention-behavior and S.E. – behavior concepts determined 51% of the variance in self-reported binge drinking behavior ($p<0.001$). After controlling for TPB, Group Norm and the Group Norm x Group Identification all had a significant change in $R^2$. With the addition of TBP, Group Norm, and GN x GI, the variance increased to 73% (Johnston & White, 2003). Although the researchers discussed the fact that the lack of Self-efficacy as a significant direct effect on behavior is inconsistent with previous studies, this is in direct opposition with the belief that according to the TPB, PBC has a direct effect on behavior. Their results could be measuring “internal control” with the use of S.E., whereas they did not measure “external control”, as the PBC does. Had the researchers
assessed both (SE and PBC) the results may have been different. Typically, in most research studies, PBC is found to be either predictive of intention or behavior, but not both (Hassan et al, 2007; Hutching et al., 2008; Norman et al, 2006; & Wall et al., 1998).

Many researchers believe past experiences shape and influence future behavior(s). For example, those who have a pleasant or acceptable past behavioral experience will be more inclined to perform this behavior in the future. Often times, college students who binged in the past and enjoyed it are more likely to perform this behavior again. Conversely, students who remember experiencing bad occurrences are less likely to perform this behavior again. Several research articles have assessed the role of past behavior as a separate construct in addition to the TPB (Collins & Carey, 2007; Cooke, Sniehotta, and Schuz, 2007; Norman & Conner, 2006).

Cooke, Sniehotta, and Schuz (2007) used an extended version of the TPB and found past behavior as a significant predictor of future behavior. Likewise, these authors assessed descriptive norms and anticipated regret as possible additional constructs above and beyond the TPB. These authors, similar to McMillian and Connor (2003), Hutching et al., (2008), and Norman and Conner (2006), employed a prospective research design measuring behavioral intentions at time one and behavior one week later. The time between measurements seems short as compared to other prospective studies. Again, ATB and PBC were statistically significant in predicting behavioral intentions ($R^2 = 37\%$), similar to the results from Collins and Carey (2007). After adding past behavior to the hierarchical regression analysis, the variance for prediction of intentions increased to 43% ($\Delta R^2 = 0.06$). Finally, step 3 added descriptive norms and anticipated regret. The variance increased again to 58% ($\Delta R^2 = 0.15$). All three of these variances were
statistically significant at the $p<0.001$. Only ATB stayed statistically significant throughout all three analyses. In the third analysis, regret was found statistically significant ($p<0.001$), whereas descriptive norms were not (Cooke et al., 2007). This last model demonstrates feeling regret supersedes what their friends are doing. In other words, the participant does not want to feel regret, even if their friends are consuming alcohol. However, even though descriptive norms were not statistically significant, the authors did not perform another analysis leaving out descriptive norms. In this case, descriptive norms could be classified as a moderating effect and thus caused the variance to decrease, when in reality the variance could have been higher.

In this same study, researchers explained behavior using the TPB variables and past behavior, descriptive norms, and anticipated regret, and found a statistically significant increase in variance when adding past behavior above and beyond intentions and PBC. While the variance changed by 7% ($p<0.01$), no statistically significant change in variance occurred after including the other constructs. Researchers here demonstrate that past behavior can affect not only the intention to perform a behavior, but past behavior can also have an effect on future behavior.

As anticipated, regret mediated the relationship between past behavior and intentions. In other words, without anticipated regret, past behavior was a statistically significant predictor of intentions, but with the addition of anticipated regret, past behavior became a nonfactor (Cooke et al., 2007). This illustrates that when taking into account the regret a person might feel knowing what happened last time they binge drank; they are less likely not to engage in this behavior again. Similarly, anticipated regret, by itself, is a statistically significant predictor of behavior, but by adding
intentions (a mediating factor); anticipated regret is a non-factor (Cooke et al., 2007). This indicates that intentions negate the anticipated regret someone may feel to binge drink.

Only one research study demonstrated no significance in the predictability of past behavior on intentions. Collins and Carey’s (2007) research explains better predictability without including past behavior in the analysis. Along with other researchers, they found self-efficacy and ATB significantly predictive of intentions, while SN did not have a significant effect. These researchers surmise a better model for the prediction of high-risk drinkers should not include past behavior. Although they argue the TPB is more effective and parsimonious without including past behavior, there are flaws in their conclusion. First, they used only freshman and sophomores as their study subjects. Including juniors and seniors and then comparing upper and lower classman would be suggested. Also, the researchers included only 122 participants. Making generalizations based on this small sample size is inappropriate. More research is needed on this concept before drawing conclusions.

As an alternative to assessing past behaviors as a separate construct, Norman and Conner (2006) evaluated the role of past behavior as a moderating variable within the TPB. They, much like Cooke et al., (2007) and McMillan and Connor (2003), used a time series measurement analysis collecting data at two different points. They used the initial assessment to measure Behavioral Intentions, and then one week later measured Behavior. Overall, past behavior was found to increase the variance of the intention on behavior relationship. However, they also discovered as past behavior increased (became more acceptable), the attitude-intention relationship decreased, showing a moderating
effect on the attitude-intention relationship (Norman & Conner, 2006). In other words, a stronger, more favorable past behavior was indicative of weaker attitude-intention relationship, and more of a habitual behavior. This also illustrates that as students have a better past experience, that alone will more likely influence their decision to perform the behavior again. Results also showed the predictive power of intentions lessened and became non-significant under high levels of past behavior (Norman et al., 2006).

Ouellette and Wood (1998) confirm these results with their own meta-analysis on intention-behavior and past behavior-behavior associations. Their results showed that of infrequently performed behaviors, past behavior was not a strong predictor, but of frequently performed behaviors, if the person had a good response, then a stronger predictor past behavior becomes on the intention. However, in this study, Oellette and Woods (1998) were not specifically examining alcohol use, instead, all risk-taking behaviors were analyzed.

Results also showed although all three constructs were significantly predictive of the intention to binge drink, only PBC failed to predict the behavior at time 2. In their hierarchical regression analysis, the ATB, SN, and PBC predicted 74% of the variance in intentions to binge drink ($p<0.001$), which several other research studies corroborate (Armitage & Connor, 2001; Cooke, Sniehota, & Schuz, 2007; and Johnson & White, 2003). In addition, by adding past binge drinking after controlling for the TPB constructs, the PBC variable increased the variance by 3%, to a total of 77% ($p<0.001$). However, similar to many other studies in this area, SN was not a significant predictor of intention to binge drink. Apparently, students (in this study) are not taking into consideration or do not care what their referent norm beliefs are. In this model, the
authors also controlled for age and gender but omitted conducting specific analyses to determine differences between males and females. Analyzing the data by sex may lend itself to the development of prevention programs based on the results of this research. Based on Norman and Conner’s (2006) research, SN might be statistically significant if assessed with females only. Additionally, these researchers split the PBC construct into two separate components, SE and PBC.

Norman and Conner (2006) model accounted for a high percentage of variance as demonstrated; however, not all published studies, utilizing the TPB, adequately explain why college students binge drink. Researchers developed and assessed other constructs designed to increase the predictability of TPB. They used descriptive norms, past behaviors as an effect on future behaviors, and self-efficacy, as well as other injunctive norms, in an attempt to better explain this unique behavior with this population. However, the TPB was not originally developed to account for these additional constructs. Although past behaviors have been significant predictors of future behaviors, especially in binge drinking, this construct is not a component of the original TRA or TPB. Likewise, although descriptive norms were found to significantly increase the predictability of this model, the TPB only accounts for the influences subjective norms has on behavior. Lastly, in the TPB, the PBC includes two separate constructs – self efficacy (intrinsic controls) and the environment or perceived control (extrinsic controls). As demonstrated by previous research, these two concepts can have separate effects on an individual and thus change the predictability of the TPB.

The development of the TRA by Ajzen and Fishbein only included a person’s attitude and the beliefs of people close to them in their intent to perform a behavior. The
decision to include a construct accounting for Perceived Behavioral Control affecting a person’s decision to perform a behavior resulted in the TRA evolving into the TPB. However, the PBC construct inconsistently predicts Behavioral Intention and/or Behavior depending on the instrument, behavior, and population. Perhaps the PBC construct lacks specification due to separate theoretical underpinnings (self-efficacy versus external factors).

Researchers attempted to address these and other criticisms of the TPB through the addition of several different constructs. However, the TPB does not account for these added constructs, and by adding these into this theory, the parsimony of the theory becomes weakened. A new model, the Integrated Behavioral Model (IBM) includes the fundamental TPB constructs as well other empirically based constructs as part of its model. Sparse research exists using the IBM in the prediction and explanation of college students and binge drinking. Prior research showed past experiences and descriptive norms help increase the predictability of theory, and given this model contains these constructs, theoretically the IBM will explain will account for more variance than TRA/TPB.

2.5 Integrated Behavioral Model

The Integrated Behavioral Model (IBM) depicts another model used to help explain and predict behavior. Much like the TPB, the IBM posits the intention to perform a behavior as the strongest predictor of behavior; however, this model includes new constructs the not utilized within the TPB. The IBM includes three main construct categories (Attitude, Perceived Norm, & Personal Agency) with two sub-constructs per
category. For example, the two sub-constructs which compose Attitude are Experiential and Instrumental Attitude; within Perceived Norm are Injunctive and Descriptive Norms, and for Personal Agency are Perceived Control and Self Efficacy.

The first construct category is Attitude, which is similar to the TPB’s Attitude Towards Behavior. Attitudes measure the respondent’s feelings toward that behavior. It answers the question, “Does he or she have an unfavorable or favorable beliefs towards performing that behavior” (Montano & Kasprzyk, 2008, pg. 78). In the IBM, Attitudes are based on Experiential and Instrumental Attitudes. Fishbein (2007) associates Experiential Attitude to affect. These attitudes are based on the respondent’s feelings about the behavior. In this case, if the person had a favorable response in the past to performing a behavior, then he or she is more likely to perform it in the future. Past behavior is an important component of Experiential Attitude and will help dictate future behavior. Similar to the Attitude Towards Behavior, Instrumental Attitude is formed from Behavioral Beliefs. This construct is knowledge based and accounts for their behavior beliefs about the outcomes of performing a behavior, much like the TPB.

The second construct category is Perceived Norm and is based on social acceptance. This approval can be from a family member, significant other, or friend. Injunctive Norms, in this model, are similar to Subjective Norms in the TPB. One construct missing from TPB that the IBM addresses is Descriptive Norms. While Injunctive Norms measure what the beliefs of your referents are, Descriptive Norms take into account what their referents behaviors are. This is important for two reasons. One, it answers the question, “do your referents participate in a particular behavior you are interested in”, and two, how often do they participate in a particular behavior. This is
important because the higher the perceived prevalence of peers participating in the behavior, the more likely the respondent will also participate in a behavior.

The third construct, Personal Agency, measures Perceived Control and Self-efficacy. Perceived Control is the perception a respondent has towards the environment around them, and the effect the environment has on their ability to perform a particular behavior. If Perceived Control is rated high by a respondent, then the participant believes they can perform a behavior without environmental influences affecting them. Self-Efficacy, conversely, is a measurement of their belief in their ability to perform a particular behavior.

2.6 Summary

One of the most important challenges confronting college students presently includes binge drinking and the associated consequences that occur. The costs suffered by college students due to binge drinking include arrests, injuries, sexual assault/rape, DUI’s, and even death. Conversely, as much attention as this issue warrants and receives, the binge drinking rate among college students has not decreased while some alcohol related consequences have increased in spite of enhanced prevention efforts.

Because of these challenges, researchers explored the addition of certain constructs to the TPB to increase the predictability and help explain why these college students continue this destructive behavior. With adequate empirical evidence, the IBM constitutes a new health behavior theory which may help to better explain health behaviors including the binge drinking which occurs among college students.
Chapter 3

Methods

Chapter three contains the methods used to conduct this study. More specifically, this chapter includes descriptions of the Participants, Instrument, Procedures, and Data Analysis used in this study.

3.1 Participant Selection

The sample for this study consisted of college students from a large Midwestern public university. Participants were chosen from randomly selected classes provided by the university registrar. The registrar used Access for this query, and the classes which met the following criteria where then randomized: Undergraduate level courses for summer 2011 term, the course had to be active, non-thesis, non-field experience, non-distance learning, taught on campus with assigned instructor, and an enrollment greater than zero. The random (Rnd) Access formula was used to assign a random number to each record returned and sorted in ascending order based on the randomly assigned number. The random sample used in this study consisted of the first 40 undergraduate general education classes from the generated list, with an added shadow sample. The number of classes chosen (40) was based on an average of 20
students per class and a desire to have 350-400 students participate in the current study (according to a power analysis as described below). The use of 20 classes in this study would reach that goal, however, because of an anticipated lower response rate of professors, that number was doubled to 40. A shadow sample represents another set of classes used in case the originally selected classes were not available for inclusion in this study. For the purposes of this study, if a professor did not agree to participate, another class from the same department was chosen for use in this study. Because some professors did refuse, in some instances, a different section from that same class was used for this study.

The Institutional Review Board (IRB) approved this study (IRB Protocol #107407) (Appendix B, C). Two response rates need reported for this study. The first response rate included the professors who agreed to participate in this study. Out of the 40 randomly chosen classes; two classes had duplicate professors, two classes were offered online, three classes were cancelled, and one class was designated for graduate students only. Thus, of the possible 32 available classes, 16 professors said “yes” for a response rate of 50%. No pattern emerged among respondent versus non-respondent classes in this study. The other response rate included the students within each class who participated in this research endeavor. A total of 356 out of 402 students completed the survey for a response rate of 89%.

According to Hoyle (1995), in order to show statistical significance for path analyses, a minimal sample size of 250 was required. Furthermore, G*Power 3, software used to determine power analysis for research in the behavioral sciences (Faul, Erdfelder, Lang, & Buchner, 2007), was used to calculate the statistical power for all relevant
research questions in this study. Entering Tail(s) = 2, Effect size $f^2 = .36$, $\alpha$ err prob = 0.05, Power (1-\(\beta\) err prob) = 0.95, and number of predictors = 6 into G*Power 3, this software determined that a sample size of 250 was sufficient for this study. The anonymity and confidentiality of these participants, along with avoiding the use of any identifiable information linking the completed survey back to the participant was of a primary goal to the researchers.

3.2 Instrument Development

The current study utilized a customized survey instrument to answer the research questions (Appendix D). This questionnaire was developed based on a comprehensive literature review of alcohol consumption among college students and the Integrated Behavioral Model (IBM). In addition, focus groups were used to elicit information to help with the design and development of this survey. Recruitment of these students (n=32) included soliciting course instructors to obtain student volunteers for this qualitative study. Incentives offered to participate, included free pizza and pop for their time and effort. Six focus groups provided information from participants about their drinking habits and behaviors. Two of the six focus groups consisted of abstainers, while two other focus groups consisted of social drinkers, and the last two focus groups consisted of binge drinkers. These six focus groups were determined based on the response to the question, “The last time you consumed alcohol in the past two weeks, you had: none, 1-4 beverages, or 5 or more drinks 94 or more for a woman.” The response given automatically placed them into one of the three focus group classifications. This segmentation of focus groups was done to determine how these three different groups
answered the elicitation questions. The focus groups were approximately 60 minutes in length, and questions used for the discussions were based on the suggestions by Montano and Kasprzyk (2008) (Appendix E) and approved by the Institutional Review Board based on the submitted protocol proposal (Appendix F). A co-moderator recorded the discussions (with pencil and paper) and afterwards all the data from each of the focus groups were compiled and reviewed for common themes. These themes were then used to help develop the questionnaire used for this study.

The focus groups consisted of 19 women (58%) while 75% of the participants were Caucasian (Table 3.1). The mean age for all participants was 21 (SD 2.9), and 36% (n=12) of all participants considered themselves seniors. When inquiring about why students binge drink, answers included having fun, it helps facilitate relationships, some use it as a stress reliever, and because friends and/or their family perform this behavior. Answers offered for reasons against binge drinking included getting sick, suffering from blackouts, DUIs, and embarrassing themselves. The focus groups stated that knowing your limits, counting drinks, using self-control, and having responsibilities as reasons to help control and avoid binge drinking.

The written questionnaire assessed the alcohol related behaviors among college students. It was comprised of 67 items on four pages. The questions included on this survey consisted of items related to the Integrated Behavioral Model (IBM), drinking habits, consequences related to binge drinking, and demographics. Consequences related to alcohol consumption were measured using 12 examples, and having the respondent write the number of times he or she experienced each consequence. All of these scales were developed using the suggestions by Montano and Kasprzyk (2008). Demographic
Table 3.1: Participant demographics in Focus Groups

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>Percent</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>14</td>
<td>42.4</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>51.8</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>33</td>
<td></td>
<td>21±3</td>
</tr>
<tr>
<td><strong>Year in School</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Year</td>
<td>9</td>
<td>27.3</td>
<td></td>
</tr>
<tr>
<td>2nd Year</td>
<td>4</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>3rd Year</td>
<td>6</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>4th Year</td>
<td>12</td>
<td>36.4</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American (Black)</td>
<td>7</td>
<td>21.2</td>
<td></td>
</tr>
<tr>
<td>Caucasian (White)</td>
<td>25</td>
<td>75.8</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td><strong>Alcohol use</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>6</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>1-4 Beverages</td>
<td>9</td>
<td>27.3</td>
<td></td>
</tr>
<tr>
<td>5 or more drinks (4 or more for a woman)</td>
<td>18</td>
<td>54.5</td>
<td></td>
</tr>
</tbody>
</table>

and background questions (13) were asked first due to the sensitivity of the questions related to drinking habits. By asking non-invasive questions first, respondents may feel less threatened and more likely to complete the survey and answer the questions honestly.

Instrumental Attitudes were defined as cognition or outcomes of the behavior performed. The measurement of this construct included five items, coded on a scale yielding potential scores ranging from one through seven. The response style for each item was a semantic differential style response with 7 potential responses anchored by two polar opposite anchor descriptors (e.g. “bad-good” and “risky-not risky”). The lower or higher the score, the more likely the respondent agrees with that particular anchor.
Experiential Attitudes can be defined as affect, or emotions based on a behavior performed. The measurement of this construct included five items, coded on a scale yielding potential scores ranging from one through seven. The response style for each item was a semantic differential style response with 7 potential responses anchored by two polar opposite anchor descriptors (e.g. “embarrassing-not embarrassing” and “not fun-fun”). The lower or higher the score, the more likely the respondent agrees with that particular anchor.

Injunctive Norms can be defined as a referent’s approval or disapproval of that particular behavioral performance. The measurement of this construct included four items. The response style for each item used a Likert-type scale ranging from “strongly disagree” to “strongly agree”. The Injunctive Norms subscale was coded so that the potential scores for each item ranged from one through seven. A higher score was interpreted as an agreement with that item while the lower the score, the more likely the respondent disagreed with that particular item.

Descriptive Norms can be defined as the respondent’s referent’s perceived behavioral performance for that particular behavior. The measurement of this construct included four items, coded on a scale yielding potential scores ranging from one through seven. The response style for each item used a Likert-type scale ranging from “strongly disagree” to “strongly agree”. A higher score indicated agreement with that item while the lower the score, the more likely the respondent disagreed with that particular item.

Perceived Control can be defined as the respondent’s control of both internal and external factors around them. The measurement of this construct included five items, coded on a scale yielding potential scores ranging from one through seven. The response
style for each item used a Likert-type scale ranging from “totally not under my control” to “totally under my control”. A higher score indicated agreement with that item while the lower the score, the more likely the respondent disagreed with that particular item.

Self-Efficacy can be defined as the respondent’s belief in their ability to perform a particular behavior. The measurement of this construct included five items, coded on a scale yielding potential scores ranging from one through seven. The response style for each item used a Likert-type scale ranging from “very difficult” to “very easy”. A higher score indicated agreement with that item while the lower the score, the more likely the respondent disagreed with that particular item.

Behavioral Intention can be described as the respondent’s intention to perform a behavior. The measurement of this construct included four items, coded on a scale yielding potential scores ranging from one through seven. The response style for each item was a Likert-type scale ranging from “strongly unlikely” to “strongly likely”. A higher score indicated agreement with that item while the lower the score, the more likely the respondent disagreed with that particular item. However, one item needed reversed coding due to the wording of the item.

Environmental Constraints can be defined as environmental influences that act on the respondent to perform a behavior. The measurement of this construct included eight items, coded on a scale yielding potential scores ranging from one through seven. The response style for each item was a Likert-type scale ranging from “strongly disagree” to “strongly agree”. A higher score indicated agreement with that item while the lower the score, the more likely the respondent disagreed with that particular item.
Teleform software (2010) was used in the design of the instrument. Teleform software allows the completed survey to be scanned into a “reader” document which assesses the survey for completeness, which at the same time allows the researcher to view the survey and make corrections or changes if indicated. After the correction procedure of the responses, the software exported the data in SPSS format. Consequently, the error associated with data entry is at a minimum.

3.3 Procedure

This study used a cross-sectional research design with single-point data collection. The data collected assessed participants’ behavioral intentions within the IBM (Attitude, Perceived Norm, and Personal Agency) to binge drink as well as their performance of this behavior. For both men and women, binge drinking was defined as consuming five or more drinks on single occasion during the past two weeks (Johnston, et al., 2001).

After approval from the University’s Institutional Review Board, the university’s Registrar sent a list of 40 randomized undergraduate courses to the investigator. Invitation letters were sent via email to the instructors of these courses for their permission to include their class in this research study (Appendix H). Survey proctor instructions are listed in Appendix I.

Confidentiality among the participants was stressed throughout the data collection process. Before the surveys were distributed to the potential participants in each class, the survey proctor instructions were read aloud to the students alerting them to the procedure for completing this survey. Upon receiving a brown envelope, the students
were instructed to open it and take out the three-page packet of materials. The cover page was the informed consent letter they were supposed to complete, sign, and hand back in to the proctor; while the next two pages were the survey used in this study. After completion of the survey, the students were instructed to place the completed form back into the brown envelope, walk it to the front of the room, and place it in a locked box. Thus, although the researchers could not guarantee anonymity, they could guarantee confidentiality.

3.4 Data Analysis

Data analysis for this study was done using SPSS version 17. The path analysis was done using EQS v6.1, a structural equation modeling software. First, descriptive statistics, including frequencies, means, proportions, percentages, and standard deviations were calculated. Second, all hypotheses were tested using a variety of statistical methods as noted below. See Appendix A for a description of each research question along with its hypothesis, outcome variable, predictor variable and statistical test used. Nonparametric tests (Chi-squares and Logistic/Linear Regression) were used for this study due to the non-normal distribution of the data obtained. The data exhibited skewedness based upon an early analysis of the raw data. Therefore parametric tests were not indicated for use in the statistical analysis of this data.

Research Question 1:

How does the prevalence of binge drinking among college students differ by demographics? Descriptive statistics, including frequencies, means, standard deviations,
confidence intervals were computed with various demographic variables. Nonparametric tests using Chi-Square were also performed to answer this research question. Odds ratios were calculated for statistical significance.

*Research Question 2:*

*What is the most prevalent consequence(s) college students experience from binge drinking?* Measurements using descriptive statistics were assessed using questions related to consequences suffered from alcohol consumption. Frequencies of each consequence were also analyzed.

*Research Question 3:*

*How much variance in binge drinking does the Integrated Behavioral Model predict?* The variances were determined by using multiple logistic and linear regression analyses. Multiple logistic regression is indicated when the outcome variable is categorical. The question, “How many alcoholic drinks did you have the last time you “partied”/socialized?” was converted to a dichotomous measure. Either "yes" or "no" was used to indicate whether the participant binge drank the last time they “partied or socialized”. The regression model was then assessed using behavior as the outcome variable and behavioral intentions and environmental constraints as the predictor variables in a logistic regression analysis.

Two steps were taken prior to analyzing behavioral intentions through the use of linear regression. First, the sum of each individual construct needed calculated. To perform this step, each item related to that construct was added together to provide one
composite score. For example, the answers for each item were coded one through seven. For a construct having four total items, the highest score an individual could receive would be 28, while the lowest score would be a four. This procedure was performed for all constructs involved. Afterwards, the IBM constructs were placed in a linear regression equation to assess the predictability of major constructs to behavioral intentions.

Research Question 4:

What constructs in the IBM (Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self Efficacy, and Behavioral Intention) are most predictive of binge drinking among college students? Using the results of the analysis described above, the constructs with a \( p \) value of less than 0.05 were considered significant predictors of binge drinking among college students.

Research Question 5:

Does the predictive validity of the Integrated Behavioral Model constructs differ by gender when predicting binge drinking among college students? Separate multiple logistic regression analyses were conducted by gender (male vs. female) to assess the predictability of each of the IBM constructs.

Research Question 6:

Does the predictive validity of the Integrated Behavioral Model constructs differ by age (21 and over vs. under 21) when predicting binge drinking among college
students? Separate multiple logistic regression analyses were conducted with age (over 21 vs. under 21) to assess the predictability of each of the IBM constructs.

Research Question 7:

Does the predictive validity of the Integrated Behavioral Model constructs differ by race/ethnicity when predicting binge drinking among college students? Separate multiple logistic regression analyses were conducted with racial/ethnicity to assess the predictability of each of the IBM constructs.

Research Question 8:

Does the predictive validity of the Integrated Behavioral Model constructs differ by Greek status when predicting binge drinking among college students? Separate multiple logistic regression analyses were conducted with Greek status (yes vs. no) to assess the predictability of each of the IBM constructs within the Greek status.

Research Question 9:

Does the predictive validity of the Integrated Behavioral Model constructs differ by athletic status when predicting binge drinking among college students? Separate multiple logistic regression analyses were conducted with athletic status (yes vs. no) to assess the predictability of each of the IBM constructs.
Research Question 10:

*What is the path model among the constructs within the Integrated Behavioral Model in explaining binge drinking among college students?*  
The path analysis used EQS version 6.1 to determine the causal links between the variables. Two endogenous variables for this analysis were used: binge drinking, and the intent to binge drink. The exogenous variables for the aforementioned endogenous variable were behavioral intention and environmental constraints while exogenous variables for the latter mentioned behavioral intentions were Experiential Attitude, Instrumental Attitude, Injunctive and Descriptive Norms, Perceived Control, and Self-Efficacy. A graphical depiction of the model is presented in chapter 4. Goodness of fit indices were calculated from the results of the path analysis.

Research Question 11

*What is the path model among the constructs within the Integrated Behavioral Model in explaining alcohol related consequences among college students?*  
This research question used the same statistical analysis as research question 10, however, the outcome variable in this question were consequences associated with binge drinking.

Research Question 12:

*What is the path model among the constructs within the Integrated Behavioral Model in explaining binge drinking among college students?*  
Two endogenous variables for this analysis were used: binge drinking, and the intent to binge drink. The exogenous variables for the aforementioned endogenous variable were behavioral intention and environmental constraints while exogenous variables for the latter mentioned behavioral
intentions were composite measures of Attitude, Perceived Norm, and Personal Agency. Combing the sum scores of EA and IA yielded the Attitude score while the sum score of IN plus DN and PC plus SE yielded the Perceived Norm and Personal Agency scores, respectively. A graphical depiction of the model is presented in chapter 4. Goodness of fit indices were calculated from the results of the path analysis.

3.5 Summary

This chapter provided an overview of the Participants used in this survey, which include college students from a large Midwestern university. These participants were chosen through a random sample of classes offered at this university from summer session one. The study used a single-point data collection method. The development of this survey instrument included the use of an extensive literature review and data obtained from focus groups. The development of the survey instrument also included the use of the Integrated Behavioral Model (IBM) and the constructs within this model as the primary focus. Analysis of this survey will include descriptive statistics, the use of multiple logistic regressions, and path analysis for causal effects in the prediction of binge drinking within the IBM. Multiple logistic regressions were also analyzed and compared to other demographic variables for significant prediction of high-risk drinking among those individual groups.
Chapter 4

Results

This chapter includes the results obtained from the analysis of self-reported data including attitudes, beliefs, and perceptions of alcohol use among undergraduate students. This chapter includes results from instrument validity and reliability analysis, followed by descriptive statistics of the demographics and inferential statistics for each research question and its hypotheses. To conclude, a summary of the results of this study are provided.

To explain and predict binge drinking among college students, the present study utilized the Integrated Behavioral Model (IBM). Binge drinking was defined as consuming five or more drinks in one sitting, within the previous two weeks, regardless of gender.

4.1 Validity of the Instrument

Validity and reliability are two characteristics of high quality surveys (Colton & Covert, 2007). Whereas validity assesses the accuracy of measuring the intention of the instrument, reliability assesses consistency. Three types of validity were assessed in this study: face, content, and construct validity. Five experts in survey design and alcohol
research assessed the questionnaire for face validity (i.e., formatting, readability and general organization of the instrument) and the content validity of items. The experts were composed of two Alcohol, Tobacco, and Other Drugs (ATOD) directors, two ATOD researchers, and one psychometric expert. Each expert received a letter asking for his/her assistance in assessing this instrument along with an attached survey (Appendix G).

The assessment for construct validity was conducted by Exploratory Principle Components Analysis (PCA) using Varimax Rotation to assess the constructs for similar subthemes. A loading factor of 0.40 or higher was used as an acceptable minimal level for factor loading. Table 4.1 contains the results for this PCA assessment.

The results of the PCA yielded eight subconstructs or themes. Although the PCA yielded eight constructs, and eight theoretical subconstructs were developed a priori, the results of the PCA did not totally confirm the a priori structure. Indeed, all a priori subconstructs grouped together. However, some questions did share factor loading with other subconstructs. For example, although all 10 Experiential and Instrumental Attitude items (EA and IA) grouped together as one subconstruct, two other survey items from different constructs also shared factor loadings with EA and IA. One survey item from Injunctive Norms and one survey item from Behavioral Intentions also were loaded on factor number one (EA/IA). Similarly, one survey item (16b) was shared between both Injunctive and Descriptive Norms. Although double loading did occur in this study, as previously discussed, the highest loaded factor occurred with the appropriate construct. Therefore, in this study, there was no indication to either delete items from the final analysis or move items to other constructs.
Table 4.1: Principal Components Analysis (PCA)* of A Priori Subscales

<table>
<thead>
<tr>
<th>Item#</th>
<th>EA/IA</th>
<th>PC</th>
<th>EC</th>
<th>SE</th>
<th>BI</th>
<th>DN</th>
<th>IN</th>
<th>EC</th>
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<tr>
<td><strong>Experiential &amp; Instrumental Attitude</strong></td>
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<td></td>
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<tr>
<td>15a</td>
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<td>18a</td>
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<td></td>
<td>0.752</td>
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<tr>
<td>19c</td>
<td></td>
<td></td>
<td></td>
<td>0.477</td>
<td></td>
<td></td>
<td></td>
<td>0.489</td>
</tr>
<tr>
<td>19d</td>
<td></td>
<td></td>
<td></td>
<td>0.724</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
19e 0.802  
19f 0.852  
19g 0.838  
19h 0.768  

**Behavioral Intentions**  

| 20a | 0.727  
| 20b | 0.803  
| 20c | 0.81  
| 20d | 0.419  

*Loading of .40 or higher was used*  

Note: EA = Experiential Attitude; IA = Instrumental Attitude; IN = Injunctive Norms; DN = Descriptive Norms; PC = Perceived Control; SE = Self-Efficacy; BI = Behavioral Intentions.

Another cause for concern was the items assessing Environmental Constraints (EC). The first three items within the EC construct were loaded on a different factor than the other five items. This implied one subconstruct (EC) measured two separate subconstructs. One reason for this irregularity could include the wording of question. The first two of 10 questions reference a reduction in binge drinking while the other eight questions reference an increase in binge drinking. The one commonality among these items is 19c for which it is shared between the two different loading factors.

### 4.2 Reliability of the Instrument

Reliability analysis is used to evaluate the consistency in measurement of a survey. In this study, two types of reliability analysis were used – Stability-Reliability (S-R) and Cronbach’s alpha (Table 4.2). Stability-Reliability assesses the consistency of the survey over time. Twenty-two undergraduate students volunteered to participate in the pilot study for the Stability-Reliability analysis. These students were obtained from a
Table 4.2: Stability-Reliability and Internal Consistency Results

<table>
<thead>
<tr>
<th>Construct</th>
<th>r</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental Attitude</td>
<td>0.87*</td>
<td>0.89</td>
</tr>
<tr>
<td>Experiential Attitude</td>
<td>0.73*</td>
<td>0.96</td>
</tr>
<tr>
<td>Injunctive Norms</td>
<td>0.79*</td>
<td>0.84</td>
</tr>
<tr>
<td>Descriptive Norms</td>
<td>0.76*</td>
<td>0.82</td>
</tr>
<tr>
<td>Perceived Control</td>
<td>0.62*</td>
<td>0.91</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>0.78*</td>
<td>0.86</td>
</tr>
<tr>
<td>Environmental Constraints</td>
<td>0.78*</td>
<td>0.82</td>
</tr>
<tr>
<td>Behavioral Intentions</td>
<td>0.60*</td>
<td>0.92</td>
</tr>
</tbody>
</table>

**: p<0.01

human sexuality class offered during the summer session. The pre- and post-assessments occurred approximately two weeks apart. The strongest of all S-R subset scores included IA (r=0.87) followed by IN (r=0.79), SE (r=0.78), EC (r=0.78), DN (r=0.76), PB (r=0.73), PC (r=0.62), and BI (r=0.60). All Pearson coefficients for this test were significant at p<0.01 level.

Internal Consistency, in contrast, measures how closely the answers provided by the respondents match up for each construct. Upon performing this analysis using Cronbach’s alpha, reliability scores for EA (α=0.96) were highest, followed by BI (α=0.92), PC (α=0.91), IA (α=0.89), SE (α=0.86), IN (α=0.84), EC (α=0.82) and DN (α=0.82). Table 4.2 showed the results of both the Stability-Reliability and Internal Consistency scores for this survey.

4.3 Participant Characteristics

Participants in this study included 171 males (48.2%) and 184 females (51.8%), representing 89% response rate in this sample. Almost 75% of the respondents identified
themselves as Caucasian (74.7%; \( n=263 \)), followed by African-American (10.5%; \( n=37 \)), Asian or Pacific Islander (6.3%; \( n=22 \)), Hispanics (3.7%, \( n=13 \)), and others (4.8%; \( n=17 \)). The mean age of these participants was 23.4 years (±5.9 years) with the minimum and maximum ages of 19 and 60 respectively. Similar demographic results were reported by this university, including males, which comprised 50% of the undergraduate population, an average age of 22.3, and 20.7% of the population consisting of racial/ethnic minorities. A slightly overrepresentation of Caucasians occurred with only 67% of the university consisting of Caucasians. Third-year undergraduate students made up the largest proportion of respondents (41.5%; \( n=146 \)) followed by 2nd year (21.9%; \( n=77 \)), 4th year (20.5%; \( n=72 \)), 5th year or greater (11.1%; \( n=39 \)), and first year (5.1%; \( n=18 \)). The majority of respondents were not affiliated with the Greek system (86.7%; \( n=306 \)).

Eighty-nine percent of the respondents attended school fulltime (\( n=311 \)). A little over a fifth of the sample population (22.7%, \( n=80 \)) participated in intramural sports. Table 4.3 describes in detail the demographics of this sample.

In addition to the demographics, the drinking patterns of the participants were analyzed. The majority of the students (77.0%; \( n=274 \)) reported spending almost four hours (±2.4) consuming alcohol the last time they partied/socialized. The number of drinks consumed by all participants in this sample, including abstainers, averaged 4.5 drinks per session (±5.4). If the abstainers are excluded, each drinker consumed 5.8 drinks per session (±5.5). Furthermore, the respondents believe it takes them an average of five drinks (±5.5) to become drunk. Thirty-seven percent of the respondents reported binge drinking the last time they partied/socialized. Also, due to their drinking behavior,
Table 4.3: Participant demographics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>Percent</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>171</td>
<td>48.2</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>184</td>
<td>51.8</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>354</td>
<td></td>
<td>23±6</td>
</tr>
<tr>
<td><strong>Year in School</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Year</td>
<td>18</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>2nd Year</td>
<td>77</td>
<td>21.9</td>
<td></td>
</tr>
<tr>
<td>3rd Year</td>
<td>146</td>
<td>41.5</td>
<td></td>
</tr>
<tr>
<td>4th Year</td>
<td>72</td>
<td>20.5</td>
<td></td>
</tr>
<tr>
<td>5th Year or greater</td>
<td>39</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American (Black)</td>
<td>37</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>22</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>Caucasian (White)</td>
<td>263</td>
<td>74.7</td>
<td></td>
</tr>
<tr>
<td>Hispanic (Latino)</td>
<td>13</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>17</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td><strong>Greek Status</strong></td>
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<td></td>
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<tr>
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<td>306</td>
<td>86.7</td>
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<tr>
<td>Yes</td>
<td>47</td>
<td>13.3</td>
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<td><strong>Member of an Official NCAA Team</strong></td>
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<tr>
<td>No</td>
<td>345</td>
<td>98.0</td>
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<tr>
<td>Yes</td>
<td>7</td>
<td>2.0</td>
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<tr>
<td><strong>Participation in Intramural/Club Sports</strong></td>
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<tr>
<td>No</td>
<td>272</td>
<td>77.3</td>
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<tr>
<td>Yes</td>
<td>80</td>
<td>22.7</td>
<td></td>
</tr>
<tr>
<td><strong>Hours spent drinking</strong></td>
<td>355</td>
<td>4±2.4</td>
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<tr>
<td>Those who binge drank the last time they partied or socialized</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>224</td>
<td>63.3</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>130</td>
<td>36.7</td>
<td></td>
</tr>
<tr>
<td><strong># of Alcoholic beverages consumed</strong></td>
<td>354</td>
<td>5±5.4</td>
<td></td>
</tr>
<tr>
<td><strong># of drinks consumed to become drunk</strong></td>
<td>341</td>
<td>5±6</td>
<td></td>
</tr>
<tr>
<td><strong>Enrollment Status</strong></td>
<td>39</td>
<td>11.1</td>
<td></td>
</tr>
</tbody>
</table>
half of the participants (50%, n=179) suffered some type of consequence in the last 30 days.

4.4 Descriptive Statistics and Correlations among IBM Constructs

Means, Standard Deviations, and zero-ordered correlations are displayed in table 4.4 for all constructs assessing behavioral intentions. Evaluating means among all constructs, EA and IA shared relatively the same views among college students. EA and IA demonstrated that student perceptions leaned slightly neutral to both their affect and outcome belief. Conversely, a mean of 2.38 for IN demonstrated their referent’s disapproval to perform this behavior while a mean of 4.43 among DN indicated uncertainty regarding their referents binge drinking behaviors. PC and SE high mean values signify confidence and strong personal control concerning their intentions to binge drink while being negatively associated with all other constructs. Furthermore, results for this correlation matrix yielded PC as the weakest construct with the smallest correlations related to all other constructs. Attitudes (EA and IA) and Norms (IN and DN) shared the highest correlations indicative of the strong associations among these constructs.

The following sections provide the results in order of the research questions and hypotheses as stated from chapter 3.
Table 4.4: Descriptive Statistics and Correlations for the IBM constructs.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>EA</th>
<th>IA</th>
<th>IN</th>
<th>DN</th>
<th>PC</th>
<th>SE</th>
<th>BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA</td>
<td>3.82</td>
<td>1.75</td>
<td>-</td>
<td>.88***</td>
<td>.64***</td>
<td>.58***</td>
<td>-.15**</td>
<td>-.35***</td>
<td>.62***</td>
</tr>
<tr>
<td>IA</td>
<td>3.45</td>
<td>1.42</td>
<td>-</td>
<td>57***</td>
<td>.48***</td>
<td>-.14*</td>
<td>-.28***</td>
<td>.58***</td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>2.38</td>
<td>1.39</td>
<td>-</td>
<td>-.54***</td>
<td>-.16**</td>
<td>-.35***</td>
<td>.51***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN</td>
<td>4.43</td>
<td>1.58</td>
<td>-</td>
<td>-.10</td>
<td>-.30***</td>
<td>.38***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>6.44</td>
<td>1.14</td>
<td>-</td>
<td>-.52***</td>
<td>-.23***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>6.16</td>
<td>1.16</td>
<td>-</td>
<td>-.40***</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>BI</td>
<td>3.25</td>
<td>2.10</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>

*: p<0.05; **: p<0.01; ***: p<0.001.

Note: EA = Experiential Attitude; IA = Instrumental Attitude; IN = Injunctive Norms; DN = Descriptive Norms; PC = Perceived Control; SE = Self-Efficacy; BI = Behavioral Intentions.

Note: All items were on a 7-point scale with a midpoint of 4.0. Higher means are indicative of stronger motivational associations with that construct.

4.5 Analysis of Binge Drinking by Demographics

Research Question 1

How does the prevalence of binge drinking among college students differ by demographics?

To assess binge drinking among the different demographics, the answer to the item asking “How many alcoholic drinks did you have the last time you partied/socialized?” was dichotomized (yes/no). This continuous variable was categorized into binge drinking (≥5 alcoholic beverages) or not binge drinking (<5 alcoholic beverages). Table 4.5 demonstrated the results of these analyses.

- Hypothesis 1.1: There is no statistically significant difference in binge drinking by age groups (legal and non-legal drinkers).

The results for age yielded no statistical significance among age groups by legal drinking age (Pearson $\chi^2=0.002$, df=1, $p=0.962$).
Table 4.5: Chi-square Analysis for Binge Drinking by Demographic

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Pearson chi-square</th>
<th>df</th>
<th>p value</th>
<th>Odds Ratio</th>
<th>95% C. I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/Ethnicity</td>
<td>28.11</td>
<td>4</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasians</td>
<td>6.51</td>
<td>2</td>
<td>1.32</td>
<td>2.24-18.90</td>
<td></td>
</tr>
<tr>
<td>Hispanics</td>
<td>5.16</td>
<td>2</td>
<td>1.12</td>
<td>1.12-23.69</td>
<td></td>
</tr>
<tr>
<td>Intramural/Club Sport Participation</td>
<td>14.84</td>
<td>1</td>
<td>&lt;.001</td>
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<tr>
<td>Yes</td>
<td>2.10</td>
<td>1</td>
<td>1.43</td>
<td>1.43-3.09</td>
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</tr>
<tr>
<td>Gender</td>
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<td>1</td>
<td>.013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.32</td>
<td>1</td>
<td>1.06</td>
<td>1.06-1.62</td>
<td></td>
</tr>
<tr>
<td>Greek Membership</td>
<td>3.53</td>
<td>1</td>
<td>.060</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Rank</td>
<td>4.76</td>
<td>1</td>
<td>.309</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrollments Status</td>
<td>0.36</td>
<td>4</td>
<td>.550</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCAA Team Members</td>
<td>0.10</td>
<td>1</td>
<td>.747</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (under/over 21)</td>
<td>0.002</td>
<td>1</td>
<td>.962</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Hypothesis 1.2: There is no statistically significant difference in binge drinking by gender.

The results for gender yielded a statistically significant difference between genders (Pearson $\chi^2=6.11$, df=1, $p<0.05$). Males were 32% more likely than females to binge drink (OR=1.32, 95% CI=1.06-1.62).

- Hypothesis 1.3: There is no statistically significant difference in binge drinking by race/ethnicity.

The results for race/ethnicity yielded a statistically significant difference among races/ethnicities (Pearson $\chi^2=28.11$, df=4, $p<0.001$). Caucasians (OR=6.51, 95% CI=2.24-18.90) and Hispanics (OR=5.16, 95% CI=1.12-23.69) were more likely to binge drink than African Americans.

- Hypothesis 1.4: There is no statistically significant difference in binge drinking by class rank.
The results for class rank yielded no statistically significant difference among grade levels (Pearson $\chi^2=4.76$, df=4, $p=.309$).

- Hypothesis 1.5: There is no statistically significant difference in binge drinking by those who play intramural sports.
  
The results yielded a statistically significant difference between those who played intramural sports and their counterparts (Pearson $\chi^2=14.84$, df=1, $p<0.001$). Those who played sports were two times more likely to binge drink than those who did not (OR=2.10, 95% CI=1.43-3.09).

- Hypothesis 1.6: There is no statistically significant difference in binge drinking by those affiliated with Greek membership.
  
The results yielded no statistically significant difference between those affiliated with Greek membership and their counterparts (Pearson $\chi^2=3.53$, df=1, $p=0.060$).

- Hypothesis 1.7: There is not statistically significant difference in binge drinking by enrollment status.
  
The results yielded no statistically significant difference between enrollment status (Pearson $\chi^2=0.36$, df=1, $p=0.550$).

### 4.6 Consequences and Binge Drinking

*Research Question 2*

*What is the most prevalent consequence(s) college students experience from binge drinking?*
The item used to assess the prevalence of consequences suffered by college students asked, “During the last 30 days, how many times did you experience the following due to binge drinking?” The options to choose from included suffering from a hangover, vomiting, drinking and driving, driving after binge drinking, memory loss, hurt or injured, got into a fight or an argument, arrested by the police, got reprimanded by the police, had unprotected sex, took advantage of someone sexually, had been taken advantaged of sexually.

- Hypothesis 2.1: Hangover is the most prevalent consequence college students experience from binge drinking.

Approximately, half of the sample (50.3%; \(n=179\)) experienced at least one consequence due to their alcohol consumption during the past 30 days. Of those who binge drank and reported consequences, a little over a fourth reported suffering from a hangover (26%; \(n=103\)) representing the most prevalent consequence from binge drinking. Other notable consequences included drank and drove (14%; \(n=54\)), blacked out (memory loss) (13%; \(n=52\)), and engaged in unprotected sex (9%; \(n=37\)) (Table 4.6).

4.7 Multiple Regression Analysis

Research Question 3

**How much variance in binge drinking does the Integrated Behavioral Model predict?**

- Hypothesis 3.1: The IBM does not predict binge drinking among college students.
Table 4.6: Alcohol Related Consequences

<table>
<thead>
<tr>
<th>Consequence:</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had a hangover:</td>
<td>167</td>
<td>1.37</td>
<td>1</td>
<td>1.88</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Vomited:</td>
<td>166</td>
<td>0.21</td>
<td>0</td>
<td>0.65</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Drove after drinking alcohol:</td>
<td>167</td>
<td>0.81</td>
<td>0</td>
<td>1.79</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Drove after binge drinking:</td>
<td>166</td>
<td>0.30</td>
<td>0</td>
<td>0.98</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Had a memory loss (blackout):</td>
<td>167</td>
<td>0.67</td>
<td>0</td>
<td>1.73</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Was hurt or injured:</td>
<td>166</td>
<td>0.17</td>
<td>0</td>
<td>0.70</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Got into a fight or an argument:</td>
<td>167</td>
<td>0.40</td>
<td>0</td>
<td>1.26</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Arrested by the police:</td>
<td>165</td>
<td>0.05</td>
<td>0</td>
<td>0.62</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Got reprimanded by the police:</td>
<td>166</td>
<td>0.17</td>
<td>0</td>
<td>1.20</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Had unprotected sex:</td>
<td>166</td>
<td>0.85</td>
<td>0</td>
<td>2.98</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Took advantage of someone sexually:</td>
<td>163</td>
<td>0.11</td>
<td>0</td>
<td>0.99</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Had been taken advantage of sexually:</td>
<td>165</td>
<td>0.07</td>
<td>0</td>
<td>0.71</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>

To assess the amount of variance predicted by the Integrated Behavioral Model (IBM) concerning binge drinking and alcohol related consequences, both linear regression and binary logistic analyses were performed. Using Behavioral Intention as the outcome variable in a linear regression analysis, the six constructs, Experiential Attitude (EA), Instrumental Attitude (IA), Injunctive Norms (IN), Descriptive Norms (DN), Perceived Control (PC), and Self-efficacy (SE) collectively predicted 43% (adjusted $R^2$) of the variance in intention to binge drink (Table 4.7).

Table 4.7: Linear Regression on Behavioral Intentions to Binge Drink using the IBM.

<table>
<thead>
<tr>
<th>IBM Construct</th>
<th>Means</th>
<th>Standard Deviation</th>
<th>Beta</th>
<th>$p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA</td>
<td>19.10</td>
<td>8.74</td>
<td>0.32</td>
<td>.003</td>
</tr>
<tr>
<td>IA</td>
<td>17.24</td>
<td>7.11</td>
<td>0.16</td>
<td>.115</td>
</tr>
<tr>
<td>IN</td>
<td>9.53</td>
<td>5.54</td>
<td>0.17</td>
<td>.009</td>
</tr>
<tr>
<td>DN</td>
<td>17.71</td>
<td>6.33</td>
<td>-0.03</td>
<td>.617</td>
</tr>
<tr>
<td>PC</td>
<td>32.22</td>
<td>5.68</td>
<td>-0.04</td>
<td>.424</td>
</tr>
<tr>
<td>SE</td>
<td>30.79</td>
<td>5.78</td>
<td>-0.18</td>
<td>.003</td>
</tr>
</tbody>
</table>

$F=34.51, df=6, p<0.001; R^2=0.44, Adjusted R^2=0.43$
Using binge drinking (yes/no) as the outcome variable in a binary logistic regression analysis, the selected IBM constructs were entered to predict binge drinking. This model accounted for 49% of the variance in binge drinking (Nagelkerke pseudo $R^2$).

**Research Question 4**

**What constructs in the IBM (Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, Environmental Constraints and Behavioral Intention) are most predictive of binge drinking among college students?**

- Hypothesis 4.1: There is no statistically significant difference between the constructs within the Integrated Behavioral Model in predicting binge drinking among college students.

Table 4.8 shows the results yielded two significant constructs: DN (Wald statistic=14.37; $p<0.001$; OR=1.15) and BI (Wald statistic=12; $p=0.001$; OR=1.09). EC resulted in a negative Beta. It appeared that when environmental constraints were lessened, college students were more likely to binge drink (Table 4.8). All other constructs yielded a positive beta indicating that as EA, IA, IN, DN, PC, SE and BI increased, their likelihood of binge drinking would increase.

**4.8 IBM Analysis by Demographics**

**Research Question 5**

**Does the predictive validity of the Integrated Behavioral Model constructs differ by gender when predicting binge drinking among college students?**
Table 4.8: Logistic Regression on Binge Drinking using the IBM

<table>
<thead>
<tr>
<th>IBM Constructs</th>
<th>B</th>
<th>Wald</th>
<th>p value</th>
<th>OR</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA</td>
<td>0.05</td>
<td>1.29</td>
<td>.256</td>
<td>1.05</td>
<td>0.97</td>
<td>1.15</td>
</tr>
<tr>
<td>IA</td>
<td>0.01</td>
<td>0.06</td>
<td>.800</td>
<td>1.01</td>
<td>0.92</td>
<td>1.11</td>
</tr>
<tr>
<td>IN</td>
<td>0.04</td>
<td>0.96</td>
<td>.327</td>
<td>1.04</td>
<td>0.97</td>
<td>1.11</td>
</tr>
<tr>
<td>DN</td>
<td>0.04</td>
<td>14.37</td>
<td>&lt;0.001</td>
<td>1.15</td>
<td>1.07</td>
<td>1.23</td>
</tr>
<tr>
<td>PC</td>
<td>0.03</td>
<td>1.83</td>
<td>.176</td>
<td>0.96</td>
<td>0.90</td>
<td>1.02</td>
</tr>
<tr>
<td>SE</td>
<td>0.04</td>
<td>1.80</td>
<td>.180</td>
<td>1.05</td>
<td>0.98</td>
<td>1.13</td>
</tr>
<tr>
<td>BI</td>
<td>0.09</td>
<td>12.00</td>
<td>.001</td>
<td>1.09</td>
<td>1.04</td>
<td>1.14</td>
</tr>
<tr>
<td>EC</td>
<td>-0.03</td>
<td>1.46</td>
<td>.227</td>
<td>0.98</td>
<td>0.94</td>
<td>1.02</td>
</tr>
</tbody>
</table>

χ²=118.15, df=8, p<0.001; Cox and Snell R²=0.36, Nagelkerke pseudo R²=0.49
Note: EA = Experiential Attitude; IA = Instrumental Attitude; IN = Injunctive Norms; DN = Descriptive Norms; PC = Perceived Control; SE = Self-Efficacy; BI = Behavioral Intentions; EC = Environmental Constraints.

- Hypothesis 5.1: There is no difference in the predictive validity of the constructs of the IBM by gender of student.

The binary logistic regression conducted to predict binge drinking by gender showed DN (Wald=13.29; p<0.001; OR=1.17) and BI (Wald=16.86; p<0.001; OR=1.14) were both statistically significant predictors among men. Conversely, EA (Wald=5.40; p<0.05; OR=1.10), DN (Wald=6.59; p=0.01; OR=1.13), and BI (Wald=6.38; p<0.05; OR=1.08) predicted binge drinking among women (Table 4.9). These results show Experiential Attitudes is a stronger predictor for binge drinking among females than males. Both genders appeared to be influenced by others’ expectations as well as intentions to binge drink.

Research Question 6

Does the predictive validity of the Integrated Behavioral Model constructs differ by age (21 and over vs. under 21) when predicting binge drinking among college students?
### Table 4.9: Logistic Regression Results by Demographic for Binge Drinking Using the IBM

<table>
<thead>
<tr>
<th>Gender</th>
<th>B</th>
<th>Wald</th>
<th>Sig.</th>
<th>OR</th>
<th>Lower</th>
<th>Upper</th>
<th>Nagelkerke pseudo $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.51</td>
</tr>
<tr>
<td>DN</td>
<td>0.16</td>
<td>13.29</td>
<td>&lt;0.001</td>
<td>1.17</td>
<td>1.08</td>
<td>1.28</td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>0.13</td>
<td>16.86</td>
<td>&lt;0.001</td>
<td>1.14</td>
<td>1.07</td>
<td>1.22</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.43</td>
</tr>
<tr>
<td>EA</td>
<td>0.09</td>
<td>5.40</td>
<td>&lt;0.05</td>
<td>1.10</td>
<td>1.01</td>
<td>1.18</td>
<td></td>
</tr>
<tr>
<td>DN</td>
<td>0.12</td>
<td>6.59</td>
<td>=0.01</td>
<td>1.13</td>
<td>1.03</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>0.07</td>
<td>6.38</td>
<td>&lt;0.05</td>
<td>1.08</td>
<td>1.02</td>
<td>1.14</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.51</td>
</tr>
<tr>
<td>Under 21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EA</td>
<td>0.13</td>
<td>8.17</td>
<td>&lt;0.01</td>
<td>1.14</td>
<td>1.04</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>DN</td>
<td>0.21</td>
<td>9.76</td>
<td>&lt;0.01</td>
<td>1.24</td>
<td>1.08</td>
<td>1.41</td>
<td></td>
</tr>
<tr>
<td>21 or older</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.48</td>
</tr>
<tr>
<td>DN</td>
<td>0.14</td>
<td>15.36</td>
<td>&lt;0.001</td>
<td>1.15</td>
<td>1.07</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>0.13</td>
<td>27.76</td>
<td>&lt;0.001</td>
<td>1.14</td>
<td>1.09</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>EC</td>
<td>-0.05</td>
<td>4.49</td>
<td>&lt;0.05</td>
<td>0.95</td>
<td>0.91</td>
<td>0.996</td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.52</td>
</tr>
<tr>
<td>Caucasian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EA</td>
<td>0.08</td>
<td>6.65</td>
<td>=0.01</td>
<td>1.08</td>
<td>1.02</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>DN</td>
<td>0.13</td>
<td>11.94</td>
<td>=0.001</td>
<td>1.14</td>
<td>1.06</td>
<td>1.23</td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>0.10</td>
<td>13.43</td>
<td>&lt;0.001</td>
<td>1.10</td>
<td>1.05</td>
<td>1.17</td>
<td></td>
</tr>
<tr>
<td>R/E Minorities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td>IN</td>
<td>0.21</td>
<td>6.47</td>
<td>&lt;0.05</td>
<td>1.23</td>
<td>1.05</td>
<td>1.45</td>
<td></td>
</tr>
<tr>
<td>Greek Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.70</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>0.46</td>
<td>7.34</td>
<td>&lt;0.01</td>
<td>1.58</td>
<td>1.14</td>
<td>2.21</td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>0.25</td>
<td>7.58</td>
<td>&lt;0.01</td>
<td>1.29</td>
<td>1.08</td>
<td>1.54</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.48</td>
</tr>
<tr>
<td>EA</td>
<td>0.08</td>
<td>7.31</td>
<td>&lt;0.01</td>
<td>1.08</td>
<td>1.02</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>DN</td>
<td>0.15</td>
<td>15.78</td>
<td>&lt;0.001</td>
<td>1.16</td>
<td>1.08</td>
<td>1.25</td>
<td></td>
</tr>
</tbody>
</table>
Intramural/Club Sports

<table>
<thead>
<tr>
<th></th>
<th>BI</th>
<th>7.99</th>
<th>&lt;0.01</th>
<th>1.07</th>
<th>1.02</th>
<th>1.13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>IN</td>
<td>5.67</td>
<td>&lt;0.05</td>
<td>1.20</td>
<td>1.03</td>
<td>1.40</td>
</tr>
<tr>
<td></td>
<td>BI</td>
<td>8.91</td>
<td>&lt;0.01</td>
<td>1.20</td>
<td>1.06</td>
<td>1.35</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>EA</td>
<td>6.21</td>
<td>&lt;0.05</td>
<td>1.08</td>
<td>1.02</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>DN</td>
<td>11.04</td>
<td>&lt;0.001</td>
<td>1.14</td>
<td>1.06</td>
<td>1.22</td>
</tr>
<tr>
<td></td>
<td>BI</td>
<td>9.22</td>
<td>&lt;0.001</td>
<td>1.08</td>
<td>1.03</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Note: EA = Experiential Attitude; IA = Instrumental Attitude; IN = Injunctive Norms; DN = Descriptive Norms; PC = Perceived Control; SE = Self-Efficacy; BI = Behavioral Intentions; EC = Environmental Constraints.

- Hypothesis 6.1: There is no difference in the predictive validity of the constructs of the IBM by age of student.

EA (Wald=8.17; \textit{p}<0.01; OR=1.14) and DN (Wald=9.76; \textit{p}<0.01; OR=1.24) predicted binge drinking among participants under the age of 21; while DN (Wald=15.36; \textit{p}<0.001; OR=1.15), EC (Wald=4.49; \textit{p}<0.05; OR=0.95), and BI (Wald=27.76; \textit{p}<0.001; OR=1.14) were statistically significant with participants 21 or older. Based on these results, students of legal drinking age were more influenced by external conditions (Table 4.9).

Research Question 7

Does the predictive validity of the Integrated Behavioral Model constructs differ by race/ethnicity when predicting binge drinking among college students?

- Hypothesis 7.1: There is no difference in the predictive validity of the constructs of the IBM by race/ethnicity of student.

The predictors of binge drinking were analyzed by racial/ethnic groups. Table 4.9 showed EA (Wald=6.65; \textit{p}=0.01; OR=1.08), DN (Wald=11.94; \textit{p}=0.001; OR=1.14), and
BI (Wald=13.43; \( p<0.001; \) OR=1.10) as statistically significant predictive constructs for Caucasians while no constructs predicted individual racial/ethnic minority categories. However, after combining all separate racial/ethnic minority categories into one minority group, IN was found significant (Wald=6.47; \( p<0.05; \) OR=1.23). Thus, while multiple factors such as experiential attitudes, their personal intentions, and their referent’s approval in performing the behavior factored into Caucasians decision to binge drink, Minorities as a whole were more likely to be persuaded by their referent’s approval or disapproval before performing this behavior.

*Research Question 8*

**Does the predictive validity of the Integrated Behavioral Model constructs differ by Greek status when predicting binge drinking among college students?**

- Hypothesis 8.1: There is no difference in the predictive validity of the constructs of the IBM by Greek status of student.

Further analyses exhibited both the IN (Wald=7.34; \( p<0.01; \) OR=1.58) and BI (Wald=7.58; \( p<0.01; \) OR=1.29) constructs showed significant predictability for those self-identifying with a Greek fraternity or sorority. EA (Wald=7.31; \( p<0.01; \) OR=1.08), BI (Wald=7.99; \( p<0.01; \) OR=1.07), and DN (Wald=15.78; \( p<0.001; \) OR=1.16) were significant predictors for those who did not self-identify with a Greek fraternity or sorority. Consequently, for those in a Greek fraternity or sorority, they are more likely to binge drink if they have their referent’s approval or when their own intentions are strong to binge drink.
Research Question 9

Does the predictive validity of the Integrated Behavioral Model constructs differ by athletic status when predicting binge drinking among college students?

- Hypothesis 9.1: There is no difference in the predictive validity of the constructs of the IBM by athletic status of student.

Moreover, Table 4.9 showed IN (Wald=5.67; p<0.05; OR=1.20) and BI (Wald=8.91; p<0.01; OR=1.20) were statistically significant constructs in explaining binge drinking among those who participate in intramural/club sports. EA (Wald=6.21; p<0.05; OR=1.08), DN (Wald=11.04; p=0.001; OR=1.14), and BI (Wald=9.22; p<0.01; OR=1.08) were statistically significant constructs for those not participating in intramural/club sports. Students who participate in intramural sports were more likely to binge drink if their referent’s approved of this behavior and if they intended to engage in this behavior.

Table 4.10 illustrated the significant constructs for the above mentioned analyses. Behavioral Intention is the most significantly elicited construct followed by Descriptive Norms and Experiential Attitude, respectively. Among all demographics assessed, the highest variance explained by IBM constructs was found in the participants who self-identified as with a Greek fraternity or sorority ($R^2=.70$). Environmental Constraints only once predicted behavior while Instrumental Attitude, Perceived Control, and Self-Efficacy did not predict behavior among any of the demographics.

4.9 Path Analysis of the IBM

Research Question 10
Table 4.10: Logistic Regression Results by Demographics for Binge Drinking Denoting Statistically Significant IBM Constructs

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*: p<0.05; **: p<0.01; ***: p<0.001

Note: EA = Experiential Attitude; IA = Instrumental Attitude; IN = Injunctive Norms; DN = Descriptive Norms; PC = Perceived Control; SE = Self-Efficacy; BI = Behavioral Intentions; EC = Environmental Constraints.

What is the path model among the constructs within the Integrated Behavioral Model in explaining binge drinking among college students?

- Hypothesis 10.1: No significant coefficients exist within the path model to predict college students binge drinking based on the IBM constructs.

A path analysis was performed to determine the relationships among the IBM constructs. Behavioral Intention to binge drink (endogenous variable) was assessed using
EA, IA, IN, DN, PC, and SE as the exogenous variables. Results showed the IBM accounted for 45% of the variance ($R^2$) in the intention to perform the behavior. Three constructs, EA, IN, and SE proved statistically significant ($p<0.05$) with path coefficients of 0.34, 0.23, and -0.28 respectively. Overall, the model based on IBM constructs to predict the intention to binge drink showed an acceptable model fit indices, as demonstrated by the Joreskog-Sorbom’s Goodness of Fit (GFI) Index (.97), Joreskog-Sorbom’s Adjusted Goodness of Fit (AGFI) Index (.78), and Root Mean-Square Error of Approximation (RMSEA) of 0.15 and its 90% confidence interval of 0.11-0.19 (Raykov and Marcoulides, 2000). Figure 4.1 showed a depiction of the path model including path coefficients and variances ($R^2$).

In the path analysis, binge drinking functioned as the endogenous variable. The exogenous variables predicting binge drinking included BI and EC. Results showed the model accounted for 26% of the variance ($R^2$) in binge drinking. However, only the BI proved statistically significant ($p<0.05$) with a path coefficient of 0.03.

Research Question 11

What is the path model among the constructs within the Integrated Behavioral Model in explaining alcohol related consequences among college students?

- Hypothesis 11.1: No significant coefficients exist within the path model to predict college students’ alcohol related consequences based on the IBM constructs.

Another path analysis was conducted using the endogenous variable, alcohol related consequences, to assess the relationship among the IBM constructs. Exogenous variables predicting the number of consequences included the BI and EC.
Results showed the model accounted for 31% of the variance ($R^2$) for drinking consequences (as a binary variable). Only the BI proved statistically significant ($p<0.05$) with a path coefficient of 0.03.

The path coefficient values remained the same from the previous model for behavioral intention since the intention to binge drink did not change, instead the focus of this particular analysis involves alcohol related consequences rather than binge drinking. Overall, the model based on IBM constructs to predict the drinking consequence showed an acceptable model fit indices, as demonstrated by the Joreskog-Sorbom’s GFI Index (.98), Joreskog-Sorbom’s AGFI Index (.85), and RMSEA of 0.11 with a 90% C.I. of...
What is the path model among the concepts within the Integrated Behavioral Model in explaining binge drinking among college students?

- Hypothesis 12.1: No significant coefficients exist within the path model to predict college students binge drinking based on the IBM concepts.

The final path analysis assessed the significance of the three major concept categories, Attitude (ATT), Perceived Norm (PN), and Personal Agency (PA), in predicting behavioral intentions to binge drink. All three concept categories, ATT, PN, and PA, exhibited statistically significance ($p<0.05$) with path coefficients of 0.27, 0.10, and -0.17, respectively. Overall, the model based on IBM pooled constructs to predict the intention of drinking showed an acceptable model fit indices, as demonstrated by the Joreskog-Sorbom’s GFI Index (.95), Joreskog-Sorbom’s AGFI Index (.75), and RMSEA of 0.19 with a 90% C.I. of 0.14-0.25 (Raykov and Marcoulides, 2000). Figure 4.3 showed the path model including path coefficients and variances ($R^2$). Table 4.11 summarized the Goodness of Fit measures for all three path models. Although most goodness of fit estimates were within acceptable range, the chi-square associated with each path analysis is not within acceptable limits.
4.10 Summary:

The results from this study yielded a 37% binge drinking rate among the participants in this study. The most frequently cited consequences due to binge drinking included suffering from a hangover (26%), driving after drinking alcohol (14%), and
blacking out (13%). Three at-risk groups for binge drinking, in this sample population, included Caucasian (OR=6.51) and Hispanic (OR=5.16) students, those who played intramural sports (OR=2.10), and males (OR=1.32). Using linear regression to assess the amount of variance predicted by this model yielded a 43% adjusted $R^2$ on intentions and a 32% (Nagelkerke pseudo $R^2$) in binge drinking. Significant constructs predicting
intentions included EA ($p<0.01$), IN ($p<0.01$), and SE ($p<0.01$) while the only significant construct predicted behavior included BI ($p<0.001$). Similar to the results provided by binary and logistic regression analysis, path analysis was conducted to assess the IBM constructs in predicting intention to binge drinking and drinking consequence. Results from the path analysis concur with the linear regression analysis, yielding three same significantly predicted constructs. Result showed EA, IN, and SE significantly predicted intention to binge drinking, while BI significantly predicted number of alcohol consumed. Furthermore, only half of the construct within this model significantly predicted intentions to binge drink. The results need to be understood within the context of this study and interpreted carefully.
Chapter 5

Conclusions

This chapter contains the following sections: 1) summary, 2) accepted and rejected hypotheses, 3) discussion, 4) limitations, 5) implications, 6) recommendations, and 7) conclusions.

5.1 Summary of the Study

Binge drinking is pervasive throughout college campuses nationwide (Core Institute, 2011; ACHA/NCHA, 2010). Excessive drinking among undergraduate college students has been problematic for U.S. society especially since the 1990s (CAS, 2002). Attempting to understand this high-risk behavior is daunting. According to the National Center for Health Statistics (2005), alcohol abuse is attributable to the three leading causes of death in college-aged students. Additionally, the binge drinking rate among undergraduate college students has remained relatively constant, around 43% for the last decade (Core Institute, 2011). Binge drinking is responsible for a variety of problems, including injuries, assaults, suicide, sexually related acts, and academic problems (Hingson et. al., 2009, Patrick and Maggs 2009, & Wechsler et al., 2002). Related costs due to binge drinking befall institutions, such as costs related to attrition, counseling, property damage, campus safety, student conduct, and judicial affairs.
Previous research indicates the TRA and TPB show promise in their predictability and validity within the high-risk population of undergraduate college students. However, there are some limitations to these theories, which include not accounting for additional concepts that could contribute to why undergraduate college students binge drink. Consequently, the Integrated Behavioral Model (IBM) was developed to include additional constructs than its predecessors, the TRA or TPB. However, limited research exists on the use of this model in assessing at-risk behavior. For these reasons, the IBM was chosen in the current study to evaluate this high-risk population.

The purpose of this study was to examine whether the IBM is useful in explaining binge drinking and alcohol-related consequences. Multiple regression and path analyses were conducted to determine the relationships among the constructs. A survey was conducted at a Midwestern university to assess the IBM in its ability to predict and explain binge drinking among undergraduate college students. The study was guided by the following 12 research questions:

1. How does the prevalence of binge drinking among college students differ by demographics?
2. What is the most prevalent consequence(s) college students experience from binge drinking?
3. How much variance in binge drinking does the Integrated Behavioral Model predict?
4. What constructs in the IBM (Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self Efficacy, and
Behavioral Intention) are most predictive of binge drinking among college students?

5. Does the predictive validity of the Integrated Behavioral Model constructs differ by gender when predicting binge drinking among college students?

6. Does the predictive validity of the Integrated Behavioral Model constructs differ by age (21 and over vs. under 21) when predicting binge drinking among college students?

7. Does the predictive validity of the Integrated Behavioral Model constructs differ by race/ethnicity when predicting binge drinking among college students?

8. Does the predictive validity of the Integrated Behavioral Model constructs differ by Greek status when predicting binge drinking among college students?

9. Does the predictive validity of the Integrated Behavioral Model constructs differ by athletic status when predicting binge drinking among college students?

10. What is the path model among the constructs within the Integrated Behavioral Model in explaining binge drinking among college students?

11. What is the path model among the constructs within the Integrated Behavioral Model in explaining alcohol related consequences among college students?

12. What is the path model among the concepts within the Integrated Behavioral Model in explaining binge drinking among college students?
The research design used to assess binge drinking among undergraduates at a Midwestern university included a cross-sectional, single-point data collection method with a shadow sample. The registrar of the university provided a detailed list of 40 randomly chosen undergraduate classes for use in the survey, including professors’ names, class times, and locations. All of the professors were sent an email explaining the nature of this study and to request their participation. Fifty-percent of the 40 professors participated in this study and allowed the researcher and his assistants to distribute surveys in their classrooms. Those collecting the data read from a script acknowledging this survey as confidential. The students were reminded that they had the right to refuse to participate. A box left at the front of the room was used to collect the completed survey forms. Two documents were collected: the Institutional Review Board consent form and the completed survey. After data collection, the completed surveys were entered into SPSS v17 using Teleform software.

Validity and reliability were assessed for intended measurement and consistency. Five experts, two in survey research, two Alcohol, Tobacco and other Drug (ATOD) prevention specialists, and one psychometric expert assessed the survey instrument for face and content validity. Based on their suggestions, a few items within the survey instrument were modified to some extent. Exploratory Principle Components Analysis using varimax rotation assessed this instrument for construct validity. The results yielded eight sub-constructs, although a limited number of items were shared among those sub-constructs. Cronbach’s alpha measured internal consistency with the lowest $\alpha$ value equaling 0.82 while stability-reliability ($s-r$) also measured consistency of the survey over time. Results for this analysis yielded moderately strong correlations, with no
correlation lower than 0.60, and all correlations significant at $p < 0.01$. Hence, both Cronbach’s alpha and stability-reliability analysis indicated this survey as a reliable instrument.

Three hundred and fifty-six undergraduate students participated in this study for a response rate of 89%. The sample population was 52% women and most participants were Caucasian (75%). Third-year students responded the most (41%) while the mean age of this sample population was 23. The average number of alcoholic beverages consumed by the participants, excluding abstainers, last time they partied and/or socialized reached almost six drinks per event. Furthermore, 37% of the sample population reported that they binge drank the last time they partied and/or socialized.

Three at-risk groups for binge drinking behavior were revealed among the demographics of this population. Caucasians (OR=6.5) and Hispanics (OR=5.2), participants in intramural sports (OR=2.1), and males (OR=1.3) were more likely than their counterparts to binge drink. After conducting a multiple linear regression analysis to assess the IBM and intention to binge drink, results yielded three significantly predictive constructs ($p<0.01$): Experiential Attitude (EA), Instrumental Norms (IN), and Self-Efficacy (SE). Using a binary logistic regression in the analysis of the IBM and behavior, results yielded one significantly predictive construct, Behavioral Intention (BI). Including all constructs, the IBM significantly predicted 43% of intentions to binge drink and 26% of binge drinking behavior. Similarly, including all constructs, the IBM predicted 32% of consequences associated with binge drinking.

A path analysis was conducted to assess the strength of the relationships between the constructs on intentions and behavior. The results of this analysis demonstrated three
significant constructs on intentions, those being EA, IN, and SE, with path coefficients of 0.34, 0.23, and -0.28, respectively. These results demonstrate that as the respondent’s EA and IN increases, so will their intention to binge drink. The path coefficient for SE, however, yielded a negative value. This indicated that as the students’ self-efficacy increased, their intention to binge drink decreased, thus providing an inverse relationship between the two. Results of the path analysis on behavior yielded one significantly predictive construct, BI. Consequently, as the intention to binge drink increased, so did the likelihood that the student would binge drink. Results using a path analysis to assess the three main concept categories yielded all three categories as significant predictors of intentions. Those concept categories, Attitude, Perceived Norm, and Personal Agency had path coefficients of 0.27, 0.10, and -0.17, respectively. Hypotheses were accepted or rejected based on the results of this study. The following is a detailed list of those that were accepted or rejected.

5.2 Accepted Hypotheses

The following four hypotheses out of seventeen were accepted:

- Hypothesis 1.1: There is no statistically significant difference in binge drinking by age groups (legal and non-legal drinkers).
- Hypothesis 1.4: There is no statistically significant difference in binge drinking by class rank.
- Hypothesis 1.6: There is no statistically significant difference in binge drinking by Greek membership.
- Hypothesis 1.7: There is not statistically significant difference in binge drinking by enrollment status.
5.3 Rejected Hypotheses

The following thirteen hypotheses out of seventeen were rejected:

- Hypothesis 1.2: There is no statistically significant difference in binge drinking by gender.
- Hypothesis 1.3: There is no statistically significant difference in binge drinking by race/ethnicity.
- Hypothesis 1.5: There is no statistically significant difference in binge drinking by those who play intramural sports.
- Hypothesis 2.1: Hangover is the most prevalent consequence college students experience from binge drinking.
- Hypothesis 3.1: The IBM does not predict binge drinking among college students.
- Hypothesis 4.1: There is no statistically significant difference between the constructs within the Integrated Behavioral Model in predicting binge drinking among college students.
- Hypothesis 5.1: There is no difference in the predictive validity of the constructs of the IBM by gender of student.
- Hypothesis 6.1: There is no difference in the predictive validity of the constructs of the IBM by age of student.
- Hypothesis 7.1: There is no difference in the predictive validity of the constructs of the IBM by race/ethnicity of student.
- Hypothesis 8.1: There is no difference in the predictive validity of the constructs of the IBM by Greek status of student.
• Hypothesis 9.1: There is no difference in the predictive validity of the constructs of the IBM by athletic status of student.

• Hypothesis 10.1: No significant coefficients exist within the path model to predict college students binge drinking based on the IBM constructs.

• Hypothesis 11.1: No significant coefficients exist within the path model to predict college students’ alcohol related consequences based on the IBM constructs.

• Hypothesis 12.1: No significant coefficients exist within the path model to predict college students’ binge drinking based on the IBM concepts.

5.4 Discussion

The descriptive data for this study on binge drinking was consistent with epidemiological trends found in other national studies (Core Institute, 2011; SAMHSA, 2011, & Wechsler, 2002). However, the binge drinking rate of 37% for this sample was slightly below the national average of 43% (Core Institute, 2011). In the current study, Males comprised 57% of those who binge drank. Of those who binge drank, 50% reported having suffered at least one negative consequence. The three most suffered negative consequences from binge drinking were a hangover (26%), driving after drinking alcohol (14%), and blacking out (13%). ACHA/NCHA (2010) reported on negative consequences associated with drinking alcohol, with their top three negative consequences including regret (32%), blackout (30%), and having unprotected sex (16%).
Certain demographic groups drank at disproportionately higher rates (Table 4.5). It appears that at-risk groups in the current study included Caucasians and Hispanics, males, and club sports participants. That is, those groups reported higher rates of binge drinking. The significance of these results indicates men had a 32% higher risk of binge drinking than did the women in this sample population. Those results corroborate what other national studies have documented (ACHA/NCHA 2010; SAMHSA, 2011). Furthermore, Caucasians were six times more likely to binge drink than other racial/ethnic classifications which are similar and consistent with Chen et al., (2004) and SAMHSA (2011). A plausible reason for this result could include the increased number of Caucasians participating in this study. Although not documented as a racial/ethnic category known for binge drinking, Hispanics were five times more likely to binge drink in this sample population. Those who played intramural/club sports also reported higher rates of binge drinking. In fact, they were two times more likely to binge drink than those who did not play sports. These results indicate the need to develop specialized health prevention programs to minimize binge drinking among these at-risk groups.

Variance is the amount of predictability explained by a theory. The higher the variance reported through analysis, the better the theory is at explaining a particular behavior. An analysis conducted to assess the predictability of the IBM in this high-risk behavior indicated the IBM explained approximately 44% of the intention to binge drink and 26% of binge drinking. These results are similar to the meta-analytical review published by Armitage and Conner (2001), which reported on average, for any behavior, the TPB explained 39% of the variance in Behavioral Intention and 27% in Behavior. A
previous study demonstrated similar results with strong predictability; 69% of the variance in Behavioral Intention and 51% in Behavior (Johnston & White, 2003).

The IBM included six constructs with three primary groupings: Attitude (ATT), Perceived Norm (PN), and Personal Agency (PA). Attitude is composed of EA and IA, while Perceived Norm and Personal Agency are comprised of IN, DN and PC, SE respectively. A path analysis helps determine the direction and significance of a construct when assessing a particular behavior or the intention to perform that behavior. A path analysis using ATT, PN, and PA as exogenous variables revealed path coefficients of 0.27, 0.10, and -0.17, respectively, while all path coefficients were significant at $p<0.05$. All six separate constructs within the three concept categories were assessed using a path analysis on the intention to binge drink (endogenous variable); results determined EA, IN, and SE were statistically significant ($p<0.05$) with path coefficients of 0.34, 0.23, and -0.27, respectively.

Results of this path analysis yielded Experiential Attitude (emotional response) as the strongest positive predictor of intention to binge drink. Respondents indicated that if one’s emotional response towards binge drinking is favorable, it is indicative of future binge drinking. Previous research on EA and its effect on intention yielded EA as a statistically significant predictor with a stronger path coefficient (Elliott & Ainsworth, 2011). Many times students base their behavior on previous experiences. The more positive an experience, the more likely they are to perform it again. Challenging alcohol expectancies and lessening their beliefs about this behavior is one challenge for prevention specialists.
Past Behavior (PB) is a component of EA, and previous researchers assessed PB as a separate construct which has produced mixed results. While Collins and Carey (2007) assessed PB without success, other research demonstrated PB as a statistically significant predictor of intention to binge drink (Cooke et al., 2007; Norman & Conner, 2006). To conclude, it appears that the EA construct within the IBM adds to the predictive validity of the IBM model. As indicated by previous research listed above, EA plays an important role in a students’ intention to binge drink, based on their past experiences.

The results from the path analysis reveal the IA construct was not predictive of intention to binge drink. Reasons for this may include no association between IA and BI in this study. Reliability and construct validity analysis revealed the items used in this survey associated well with the construct (IA) and without any problems. Conceivably, a confounder could play into the results or lack of significance in this construct. An example of a potential confounder for this particular construct could be referents. Although the respondent knows binge drinking is unhealthy, the fact that peer pressure is present may be enough to override their IA. Moreover, the anchors used for these items may not have adequately measured this construct. Examples of anchors used in this assessment included Bad-Good, Risky-Safe, and Foolish-Wise, which may not have resonated with the participants.

Other researchers used fewer items or measured IA in terms of health (Elliot & Ainsworth, 2011). Stronger results for this construct may occur if the items are related back to the health of the individual completing the survey. By asking the participants to read the examples and contemplate their own health, researchers may obtain a more
meaningful answer. Regardless, this construct failed to predict intention in this study, although according to Armitage and Conner (2001), Attitude Towards the Behavior is typically the most predictive construct of intention to binge drink. This indicates that in this study, IA needs to be reassessed for content.

The Injunctive Norms construct measures the referent’s approval or disapproval in performing a particular behavior. According to Montano and Kasprzyk (2008), the Subjective Norms construct measures this same concept within the TPB. Consistent with the literature and with the present results, Injunctive Norms yielded a statistically significant, moderate path coefficient of 0.23, demonstrating the weakest of all significant path coefficients. This could be due to the respondent taking into account their referent’s opinion about the behavior; however, they still made their own decision, not necessarily basing it solely on their referent’s approval or disapproval. Similarly, Armitage and Conner (2001) documented that the Subjective Norm construct, in all TPB research yielded the weakest of all predictors in the TPB. Nevertheless, other published research on the TPB and alcohol use indicates that Subjective Norms predict behavioral intentions (McMillian & Conner, 2003; Park et al., 2009). Overall, this construct demonstrates that respondents’ intention to perform a particular behavior is based on their referents’ approval or disapproval.

Although results of this study indicated Injunctive Norms significantly predicted the intention to binge drink, descriptive norms were not found significant. A variety of reasons may exist for this result. The most likely reasons for the non-significance of descriptive norms are either no association between DN and Intentions, or perhaps the involvement of a confounding variable, such as the respondents’ overestimation of this
behavior. Furthermore, the framing of these items could be problematic. Perhaps respondents did not feel any of the items were appropriate or pertained to their situation. Other researchers based all of their DN items on “friends” or “peers,” while still other researchers simply examined the relationship between gender and binge drinking (Cooke et al., 2007; Johnston & White, 2003).

The four items assessing DN in this study used “best friend,” “friends,” “college students at this university,” and “college students nationally” as references points. Park et al. (2009) classified Descriptive Norms into a dichotomy with proximal norms eliciting more influence than distal norms. In other words, those close to the respondent were more likely to influence their behavior than those of different or unrelated groups. Therefore, an analysis in this study was performed delineating between proximal norms (best friend and friends) versus distal norms (college students at this university and students at the national level) using a path analysis. However, the results indicated neither the proximal nor distal norms were statistically significant in predicting behavioral intention or binge drinking. This could be due to the fact that only two items were used. The possibility of not enough items to elicit statistical significance is of concern.

As indicated from these results, social norms programs should be employed to decrease the relevance of DNs. Social Norms programs are designed to correct misperceptions of binge drinking behavior, and the primary way to alleviate DN is by social norms interventions. Although the literature indicates mixed results, success has been found in the past by using Social Norms programs to decrease the binge drinking rate on college campuses (Glassman and Braun, 2010).
Self-efficacy is the belief that internally, a person has the power to perform a particular behavior within a specific context. Consistent with the literature and with the present results, Self-Efficacy yielded a statistically significant, moderate path coefficient of -0.28. This demonstrates SE was a statistically significant construct that played an important role in a college student’s intention to binge drink. However, in this study results yielded a negative path coefficient which indicated an inverse relationship between self-efficacy and behavioral intention. Thus, as self-efficacy became stronger, intention to binge drink lessened, and vice versa. For example, in this study, the participants believed that internally, they had the strength to refuse alcohol consumption or they believed that they could avoid binge drinking. Results from Collins and Carey (2007) also indicated a statistically significant negative link between SE and intention.

Conversely, Perceived Control did not prove statistically significant in the current study. Similarly, the Perceived Behavioral Control (PBC) construct within the TPB tended to elicit mixed results (Hassan and Shiu, 2007; Hutchignton et al., 2008, & McMillian and Conner, 2003). In the TPB, PBC accounted for external as well as internal factors associated with a person’s belief to control those factors. Previously published research reports that the PBC did not predict intentions (Hassan & Shiu, 2007; Hutchting et al., 2008; Wall et al., 1998). In contrast, other researchers found PBC to significantly predict intention (Cook et al., 2007; Norman & Conner 2006). Reasons for the current study not finding significance could include no association between PC and Intentions, the role of a confounding variable, or that the items did not elicit the response the researchers were trying to obtain. In this study, it appears as though the respondents all felt they had control over their drinking. Because this is self-reported data,
participants may have overestimated their perceived control. For example, students believe they have control when they actually do not. The environment, their peers, and the drug (alcohol) affect them more than they believe. Likewise, national data indicates they have a lack of perceived control, as demonstrated by the high rate of binge drinking among these studies (Core Institute, 2009).

As previously reported, BI significantly predicted behavior. Similar results by other researchers acknowledged the significance of the BI construct on behavior (Collins and Carey, 2007; O’Callaghan, Chant, Callan, & Baglioni, 1996). The Behavioral Intention construct predicted 26% of the variance in behavior, which is similar to Armitage and Conner’s (2001) meta-analytical review. However, intentions do not always predict behavior. For example, different situations may dictate different intentions or the need for students to change their original intention. Similarly, the complexity of the behavior may dictate intentions. Another plausible reason for a weakened relation or no relation between intentions and behavior includes the time frame from intention to actual behavioral performance. The longer the time between intention and behavior, the less likely the behavior will be performed.

Conversely, Environmental Constraints (EC) did not significantly predict behavior. According to the IBM, EC predicts behavioral performance. However, the findings in the current study are in direct opposition with previous research which shows such examples as alcohol density (the number of alcohol establishments within a particular area) (Scribner, Mason, Theall, Simonsen, Schneider, Towvim, & DeJong, 2008), liquor specials and promotions (O’Mara, Thombs, Wagenaar, Rossheim, Merves, Wei,… & Goldberger, 2009; Thombs, Dodd, Pokorny, Oml, O’Mara, Webb,… &
Werch, 2008) and availability (Stockwell, 2006) as environmental factors which influence behavior. Two possibilities existed for this lack of predictability. One conclusion included the wording of the items. The likelihood existed that the items were too extreme or the chosen examples did not elicit the results the researchers were attempting to assess. Second, this construct in particular elicited two separate subthemes after conducting an analysis using PCA with Varimax rotation. The two subthemes could mediate one another and thus provide non-significant results. These irregularities were not adjusted for in this study.

Path analyses were also conducted to determine the efficacy of the IBM in predicting alcohol-related consequences. The goodness of fit, as measured by the Chi-square, GFI, AGFI, and RMSEA (Table 4.11) suggested an acceptable fit using the IBM. Although other research corroborates these findings that intentions to binge drink significantly predict binge drinking (Collins & Carey, 2007; Elliot & Ainsworth, 2011), there is a dearth of research on using consequences as the behavior (dependent variable) in a path analysis. Therefore, this is the first known application of this theory using the IBM to explain and predict alcohol consequences, rather than exclusively binge drinking.

The IBM was assessed using gender as a demographic variable in an attempt to determine which constructs within this model predicted binge drinking. Consistent with previous research, EA predicted Behavioral Intention among both sexes (Cooke, Sniehotta, & Schuz, 2007; Norman & Conner, 2006). Another shared commonality among gender is DN; however, only EA predicted intention among females. As expected, males and females’ intention to binge drink appear to mirror their perceptions of their peers’ drinking behavior (Cooke et al., 2007; Norman & Conner, 2006). In
Hassan and Shiu (2007) and Hutching et al. (2008), IN significantly predicted binge drinking among women, while in the current study, IN was not significant. Lastly, significance occurred between gender and the intention to binge drink. In summary, different factors cause males and females to drink. Men are more guided by their referents’ performance, while women base their intention to binge drink on their own experiential attitudes. Consistent with the literature, males drink more than females, which may reflect cultural beliefs within certain subgroups where heavy drinking is associated with masculinity. Furthermore, in this study, males were more likely than females to binge drink (OR=1.33).

From a legal standpoint, the most important demographic involving binge drinking is age. The results from the logistic regression revealed EA and DN as predictors of binge drinking among underage college students, while DN, BI, and EC explained excessive drinking among those of legal age. Additionally, EC yielded a negative coefficient, indicating that as environmental constraints become more stringent, binge drinking decreased in likelihood. Thus, it appears that regardless of age, DN influenced binge drinking. However, underage students appear more encouraged by EA, whereas participants of legal age to drink were influenced more by environmental constraints and their behavioral intention. Research has yet to compare those 21 and older versus those under 21 using the TPB; thus, no comparisons can be made with previous results.

Thus, those of age seem to anticipate binge drinking, or make plans to binge drink. Conversely, underage students seem more impulsive. Underage students’ attitude towards alcohol consumption, which may be in part a reflection of their prior
drinking experiences, influences their current alcohol consumption patterns. They do not necessarily plan on binge drinking, however, if the opportunity arises, they more than likely would perform this behavior. In summary, underage students’ drinking patterns appear much more spontaneous, whereas students who are older tend to consider environmental cues and plan their drinking. Those of legal age are driven by their intention to binge drink and environmental constraints more so than based on their attitude.

In the current study, Caucasians were six times more likely to binge drink than other racial/ethnic minorities, and as noted in previous studies, racial/ethnic minorities typically consume less alcohol than Caucasians and binge drink even less, as indicated in table 4.3 (O’Malley et al., 2002; Wechsler et al., 2002). All five racial categories (African-American, Asian, Caucasian, Hispanic, and Other) were analyzed separately to determine which constructs within the IBM predicted binge drinking. However, none of the IBM constructs were statistically significant in predicting binge drinking among minority categories. After combining racial/ethnic categories due to the low number in each group, IN became the only statistically significant construct within those racial/ethnic categories, while EA, DN, and BI were significant predictors for Caucasians. These findings suggest that Caucasians based their binge drinking behavior on their emotional response associated with their last binge drinking episode, as well as on their friends’ behavior. In addition, the intent to binge drink is a strong indicator among Caucasians, indicating that the stronger their intention to binge drink, the more likely it is that they will binge drink. In other words, Caucasians enjoy binge drinking and are more likely to binge drinking if their referents binge drink. It seems as though
Caucasians follow along with other people’s behavioral performance, as opposed to racial/ethnic minorities. They want to be accepted and considered “part of the crowd”. Conversely, unlike Caucasians, the approval or disapproval of racial/ethnic minorities’ friends (and others) about this behavior does affect their binge drinking behavior. Thus, racial/ethnic minorities, unlike Caucasians believe it is more important to listen to their referent’s opinion than follow along with what others are doing.

In this study, 13% (n=47) of the undergraduate students acknowledged membership in a Greek Fraternity or Sorority. Of the 47 participants, 23 admitted to binge drinking the last time they partied or socialized. As a result, almost 50% of the Greek population in this study binge drank, which corroborated previous research assessing Greek membership and binge drinking rates (Seo & Li, 2009; Wechsler et al., 2002). However, no significance occurred in this study between binge drinking and this Greek population.

Injunctive Norms and BI predicted binge drinking among the Greek population, whereas EA and DN constructs were more influential among non-Greek members. It is not necessarily due to Greek members’ friends’ binge drinking, but the peer pressure that comes from their referents that predicts their binge drinking. Likewise, their intention to binge drink had significant consequences on that behavior.

Similar to results provided by the respondents in Greek fraternities or sororities, those participating in intramural/club sports revealed the same, significant constructs. Typically, those who played sports intended to binge drink and with the approval from their friends to perform this behavior, which encouraged the behavior. Thus, these two at-risk populations base their drinking habits on their friends’ approval coupled with their
intention to binge drink. New prevention programs need to address components covering Injunctive Norms and Behavioral Intentions for these two at-risk populations.

5.5 Limitations

A variety of limitations existed within the current study. The most prominent limitations involved the use of self-reported data and social desirability. The effect of recall bias is inherent in self-reported data (Portney & Watkins, 2000). Recall bias occurs when a respondent forgets or cannot remember an event or behavior in the past. In this case, respondents may not remember the number of alcoholic beverages consumed the last time they partied and/or socialized, or may not remember suffering a consequence due to their drinking behavior. Likewise, their lack of memory of the event could affect their answers to the items related to the IBM, such as Attitudes, Norms, and Personal Agency.

Non-response bias represents an additional concern which could have compromised the results of this study. Unfortunately, a small percentage of students left some questions unanswered. In the most extreme cases, some participants misread the instructions, which led to the participant skipping all the items in one construct or overlooking a whole page of questions. There was one skip pattern in the survey which caused minor confusion among some of the participants. Thus, the internal validity of the results constitutes a concern; at the same time the large number of subjects in this study minimizes issues associated with the missing data.

The time in which the data collection occurred poses a possible limitation, as well. For instance, typically, data collected from undergraduate college students occurs in the fall or spring semester, while in this study, student data were collected in the
summer. Thus, a higher percentage of nontraditional students (e.g., older students, students with families, goal/career oriented students) may exist in the study sample (mean age of 23.4), potentially skewing the results. Since during the summer semester, fewer traditional students attend classes, the binge rate should decrease because on average this group would tend to drink less (Jinkens, 2009). Future research should assess how binge drinking rates differ during the fall, spring, and summer semesters.

Similarly, the lack of freshman representation in this study might skew the results of this study. Previous research documents juniors and seniors slightly more likely to binge drink than freshman and sophomores (Wechsler et al, 2002). Results of the College Alcohol Survey yielded a binge drinking rate between 40 – 45% for all four grade classifications. Only 5% of this current study includes freshman. Therefore, the inclusion of more freshmen would probably decrease the binge drinking rate only slightly, although the possibility exists that this change could alter the results of the IBM analysis. Beliefs about alcohol use among freshman are different than those of upper classman. Another plausible reason for the lack of freshman representation might include the time of this study. For example, those who were freshman in the spring now consider themselves sophomores during the summer semester, and at this point, the possibility of inaccurate representation could have occurred. Conceivably, freshmen are less likely to take classes in the summer and thus, the reason for a lower rate of freshman participation. Loss to attrition represents another possibility, in other words, due to freshmen students’ alcohol consumption, they have already dropped out.

Because of the large sample size, the possibility of Type II error may have occurred, while the possibility of obtaining a smaller sample size could elicit different
constructs as significantly predictive of binge drinking behavior. In a path analysis, a significant $\chi^2$ suggests a poor fit with the model (Raykov & Marcoulides, 2000), while in this study, the $\chi^2$ results did suggest statistical significance. Although the $\chi^2$ results suggested a poor fit for the IBM model, the other goodness of fit measurements GFI, AGFI, and RMSEA (Table 4.8) indicate the IBM fit well with the current data.

The research design for this investigation utilized a cross-sectional, single-point data collection design from which no causal inferences can be made. Attitudes, intentions, and behaviors do not always change concurrently. Furthermore, because these variables are constantly evolving and changing, this may possibly impact the results. Similarly, the intent of the IBM is to measure the intention of a behavior and the behavioral performance at two separate points in time; however, due to a lack of resources and time, the current study did not employ that type of research design. Previous researchers used prospective time-series research designs to measure intention and behavior and different times, with results similar to this study, indicating that the results in this study merit similar consideration (Huchting et al., 2008; Johnston & White, 2003; and McMillian & Conner, 2003).

Using the PCA to assess this survey, certain items were shared across multiple constructs. Although a few items were shared among loading factors, no adjustment was made for this interaction during the statistical analysis. Because of this, the results could vary and yield different interpretations.

Finally, Cronbach’s alpha and stability-reliability analyses showed variable results for these two reliability measures. Although Cronbach’s alpha values ranged from 0.82 ($\alpha$) to 0.96 ($\alpha$), this demonstrated strong internal consistency among the items in this
survey. However, a stability-reliability analysis revealed inconsistent results, ranging from 0.60 \((r)\) to 0.87 \((r)\). The two lowest correlations included PC \((r=0.62)\) and BI \((r=0.60)\). PC did not predict intention to binge drink, while BI significantly predicted behavior. While these results are within acceptable limits, this represented an opportunity to improve the psychometric properties of this questionnaire by revising the less stable items.

5.6 Implications

This study attempted to assess the utility of the IBM to predict and explain binge drinking among undergraduate college students. This assessment can help advance the field of prevention, specifically high-risk drinking, and guide the development of initiatives to decrease binge drinking on college campuses. This constant rate of binge drinking among college students makes it imperative to attend to this growing public health concern in the United States.

Research through this study yielded three important contributions. First, students surveyed based their binge drinking behavior on Experiential Attitudes. That is, students reported acting more on expectations, rather than the outcome of their behavior (LaBrie, Grant, & Summer, 2011). They understood binge drinking has consequences, and acknowledged they knowingly disregarded these health hazards and continued to binge drink. Second, students surveyed were influenced to drink based on their referent’s approval or disapproval rather than by the drinker’s behavior. Therefore, prevention programs must encourage students not to binge drink because their friends binge drink, but rather to listen to the opinions of their referents and follow those opinions. For
example, the opinions of these referents could focus on abstaining or moderating drinking while persuading those not to binge drink. Third, students reported strong self-efficacy in their ability to control their drinking. Therefore, prevention programs should focus on strengthening self-efficacy (through refusal or avoidance techniques) among the participants. Consequently, using the IBM at different colleges or universities and evaluating these interventions could ascertain which constructs prevention specialists should include in the development of prevention programs in order to limit or reduce binge drinking on their campuses.

5.6 Recommendations

A number of recommendations for future research emerged from this investigation, as follows:

- Apply this model at other universities. Using this survey as an assessment will help determine how programs should be developed and where resources should be allocated. By administering this survey and assessing the separate constructs by demographics, prevention specialists can isolate at-risk participants or specific groups that would benefit from prevention programs.

- Assess the IBM model using a time-series research design for a particular behavior. The IBM model is based on the primary belief that intention to perform a behavior is the main indicator of behavioral performance. With that in mind, assessing a respondent’s intention to perform a behavior at time one and measuring how much they performed the behavior at time two is indicated. Researchers used this type of research design with the
TPB, and obtained significant results (Hutchington et al, 2006; McMillian & Conner, 2003). In order to assess construct validity more effectively, prospective research needs to be conducted with the IBM.

- Use the IBM to assess other high-risk behaviors. For example, Kasprzyk and colleagues (1998) used a slight variation of the IBM model to assess condom use with high-risk groups. Additional assessments should include high-risk groups, such as those who smoke marijuana, use cigarettes in high school, or those who do not engage in physical activity. There are many applications for this model; expanding it to other populations such as minorities or the elderly is another possibility.

- Assess binge rates at various times during the school year. Previous research indicates that excessive alcohol consumption is associated with the college football season (Glassman, Werch, Jobli, & Bian, 2007; Neal and Fromme, 2007). Because of this phenomenon, assessing binge drinking by semester may reveal the fall semester with the highest binge drinking rate, followed by spring and summer semesters, respectively. Therefore it would be informative to compare drinking habits of undergraduate college students by semester.

- Conduct interventions which utilize counter advertising strategies to offset the commercial maker. The results of this research indicated Experiential Attitude as a significant predictor of binge drinking. EA is aligned with positive alcohol expectations that college students have. Thus, there is a
need to challenge these expectations through the use of health communication interventions, online education, or in-class presentations.

- Develop prevention programs for undergraduate students in the Greek system based on Injunctive Norms and Behavioral Intentions. Incorporating these two constructs into prevention programs, whether newly developed or reevaluated, should increase program success and minimize excessive alcohol consumption among the at-risk college populations.

- Use Injunctive and Descriptive Norms to develop prevention programs. The IN and DN constructs, when assessed on separate demographics such as females, undergraduate college students of all ages, and Caucasians, explained intention to binge drink (Table 4.6). Thus, an intervention used to decrease binge drinking should incorporate Social Norms Theory (SNT). The premise for SNT theory is that the participants’ behavior is influenced by their perceptions regarding the prevalence of that behavior, as well as what they think about it (Dunleavy, 2008). The goal of a Social Norms intervention is to correct misperceived beliefs about a particular behavior (Perkins, 2002). Often, undergraduate college students overestimate alcohol consumption patterns among their peers, thus placing themselves at greater risk for binge drinking (Perkins, 2002). Based on the results of this study, developing an intervention to correct these misperceived beliefs is highly recommended with all demographics
assessed in this study (Table 4.9) except those not affiliated with Greek membership or those who do not participate in intramural/club sports.

- Create a culture where binge drinking is unacceptable and not tolerated. This can be done by involving opinion leaders and key informants in prevention programs and including those select few in marketing materials. This recommendation directly relates to the results of this study which documented the significance of Injunctive Norms among this population.

- Program development to reduce or eliminate binge drinking must include and focus on Self-Efficacy and increasing an individual’s confidence in abstaining from or refusing alcohol consumption.

- Revise the survey that was used in the current study. By developing and implementing focus groups to review this assessment tool, future researchers may be able to incorporate suggestions into the survey and improve upon the existing survey. Additionally, use the results of the PCA with Varimax rotation to better distinguish between the constructs and items which may have shared loading factors. The ability to assess this model will increase with continued development and synthesis of the survey.

5.8 Conclusions

The Integrated Behavioral Model, although limited in its use thus far, shows promise in its application regarding binge drinking among undergraduate college students. Prevention initiatives should focus on at-risk groups which, as indicated by the
results of this study, included Caucasians, Hispanics, those who played in intramural sports, and male undergraduate college students. For example, targeting at-risk groups such as Caucasians for participation in prevention programs based on the EA, DN, and BI constructs is imperative, as is offering prevention programs based on the IN construct for Hispanics. Similarly, it is crucial to develop prevention programs based on IN and BI constructs that target those who participate in intramural sports. It is also important to develop programs based on DN and BI constructs that target male undergraduate college students.

The IBM should be investigated further and used as a guide in developing prevention programs. Like its predecessors, the Theory of Planned Behavior and the Theory of Reasoned Action, the Integrated Behavioral Model explained 44% of intentions to binge drink among undergraduate college students. It goes beyond the TPB and TRA, in that it can analyze more constructs than its predecessors and therefore encompasses more potential antecedents to a particular behavioral intention. This research supports the efficacy of the IBM however, the findings should be interpreted cautiously. Other studies involving different population groups and behaviors need to be conducted to further evaluate this model’s utility in predicting and explaining behavior.
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Appendix A

Research Questions and Statistical Tests
**Research Question 1:** How does the prevalence of binge drinking among college students differ by demographics?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>The prevalence rate of high-risk drinking does not differ by demographics.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Demographic variables Nominal: • Sex • Race • Athletic Status • Greek Status Ordinal • Age • Year at UT</td>
<td>Frequencies Proportion Chi-squares Odds ratio</td>
</tr>
</tbody>
</table>

**Research Question 2:** What is the most prevalent consequence(s) college students experience from binge drinking?

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binge Drinking (Y/N)</td>
<td>Frequencies and proportions</td>
</tr>
</tbody>
</table>

**Research Question 3:** How much variance in binge drinking does the Integrated Behavioral Model predict?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>The IBM does not predict binge drinking among college students.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Multiple Logistic Regression</td>
</tr>
</tbody>
</table>
**Research Question 4:** What constructs in the IBM (Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions) are most predictive of binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no statistically significant difference between the constructs within the Integrated Behavioral Model in predicting binge drinking among college students.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Odds Ratio and Multiple Logistic Regression</td>
</tr>
</tbody>
</table>

**Research Question 5:** Does the predictive validity of the Integrated Behavioral Model constructs differ by gender when predicting binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no difference in the predictive validity of the constructs of the IBM by gender of student.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Multiple Logistic Regression</td>
</tr>
</tbody>
</table>
Research Question 6: Does the predictive validity of the Integrated Behavioral Model constructs differ by age (21 and over vs. under 21) when predicting binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no difference in the predictive validity of the constructs of the IBM by age of student.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Multiple Logistic Regression</td>
</tr>
</tbody>
</table>

Research Question 7: Does the predictive validity of the Integrated Behavioral Model constructs differ by race/ethnicity when predicting binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no difference in the predictive validity of the constructs of the IBM by race/ethnicity of student.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Multiple Logistic Regression</td>
</tr>
</tbody>
</table>
**Research Question 8:** Does the predictive validity of the Integrated Behavioral Model constructs differ by Greek status when predicting binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no difference in the predictive validity of the constructs of the IBM by Greek status of student.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Multiple Logistic Regression</td>
</tr>
</tbody>
</table>

**Research Question 9:** Does the predictive validity of the Integrated Behavioral Model constructs differ by athletic status when predicting binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no difference in the predictive validity of the constructs of the IBM by athletic status of student.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Multiple Logistic Regression</td>
</tr>
</tbody>
</table>
**Research Question 10:** What is the path model among the constructs within the Integrated Behavioral Model in explaining binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>No significant coefficients exist within the path model to predict college students’ binge drinking based on the IBM constructs.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Path Analysis</td>
</tr>
</tbody>
</table>

**Research Question 11:** What is the path model among the constructs within the Integrated Behavioral Model in explaining alcohol related consequences among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>No significant coefficients exist within the path model to predict college students’ alcohol related consequences based on the IBM constructs.</td>
<td>Consequences (Q11)</td>
<td>Constructs – Experiential Attitude, Instrumental Attitude, Injunctive Norm, Descriptive Norm, Perceived Control, Self-Efficacy, and Behavioral Intentions</td>
<td>Path Analysis</td>
</tr>
</tbody>
</table>
Research Question 12: What is the path model among the concept categories within the Integrated Behavioral Model in explaining binge drinking among college students?

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome Variable</th>
<th>Explanatory Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>No significant coefficients exist within the path model to predict college students’ binge drinking based on the IBM constructs.</td>
<td>Binge Drinking (Y/N) (Q8)</td>
<td>Construct Categories – Attitude, Perceived Norm, Personal Agency</td>
<td>Path Analysis</td>
</tr>
</tbody>
</table>
Appendix B

IRB Proposal for Survey
# Social, Behavioral & Educational Research Protocol Application

This application must be completed electronically and saved as a new document, please do not complete by hand.

## A. STUDY INFORMATION

<table>
<thead>
<tr>
<th>Date of Submission:</th>
<th>5/9/11</th>
<th>IRB Number &amp; Category:</th>
<th>107407</th>
<th>Expedited</th>
<th>Convened</th>
</tr>
</thead>
</table>

**Study Title:** Using the Integrated Behavioral Model to Predict Binge Drinking among College Students

**Intended purpose for this application:**
- [ ] Master Thesis
- [x] PhD Dissertation
- [ ] Course requirement
- [ ] Scholarly presentation
- [ ] Scholarly dissemination
- [ ] Other

**Principal Investigator:** Tavis J. Glassman, PhD, MPH, CHES
**Rocket ID #:** R00237753

**Department:** Health & Recreation Professions
**Office #:** X1006

**Phone #:** X2770
**UT Email:** tavis.glassman@utoledo.edu

**Student Investigator:** Robert E. Braun
**Rocket ID #:** R00679731

**Student’s Phone #:** 240-593-6251
**UT Email:** Robert.braun@rockets.utoledo.edu

## B. STUDY FUNDING

**Funding Status:**
- [ ] Funded
- [ ] Unfunded
- [x] Pending

**Funding Source:**
- [ ] Intramural
- [x] *Extramural

If Intramural, please provide the UT Account #: 

*If Extramurally funded, please complete the following:

**Agency/Company Name:**

**Agency/Company Address:**
C. PERFORMANCE SITE(S)

List all sites at which you will conduct this research. Attach permission letters on site letterhead and/or current IRB approval memos for off-campus sites. Check box if site is “engaged in research.” A site becomes “engaged in human subjects research when its employees or agents: (i) intervene or interact with living individuals for research purposes; or (ii) obtain individually identifiable private information for research purposes [45 CFR 46.102(d)(ii)].

<table>
<thead>
<tr>
<th>Performance Site Name</th>
<th>Address</th>
<th>Engaged in research</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Toledo</td>
<td>2801 W. Bancroft Ave., MS#119</td>
<td>X</td>
</tr>
</tbody>
</table>

D. STUDY PERSONNEL

Please list all study personnel involved in the conduct of this study. Anyone who is “engaged in research” must be listed below. This includes all study personnel who, for research purposes, interact or intervene with subjects, have access to subjects’ identifiable private information or obtain informed consent of subjects. This list may be different (often longer) than the key personnel list included in a grant.

Check the box under UT for each person who is affiliated with UT. Only UT faculty, staff, students, or registered volunteers are considered “UT-affiliated” and thus covered by the UT IRB review. All non-affiliated study personnel must have their participation reviewed by the appropriate IRB and cannot begin activities until their IRB approval is on file.

As of July 2010, all new study personnel must complete human subject research training via the UT-CITI training site. Training information can be accessed at [http://www.uoedo.edu/researchRC/HumanSubTraining.html](http://www.uoedo.edu/researchRC/HumanSubTraining.html). If you completed the former UT training program prior to July 2010, your existing education will remain valid until renewal training requirements are implemented.

The IRB does not review research applications until all research personnel have completed their training.

<table>
<thead>
<tr>
<th>FIRST/LAST NAME</th>
<th>UT</th>
<th>ROCKET ID #</th>
<th>PARTICIPANT’S TITLE IN THIS RESEARCH</th>
<th>PARTICIPANT’S ROLE IN THIS RESEARCH</th>
<th>TRAINING COMPLETE</th>
<th>CCI FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert E. Braun, MPH, CHES</td>
<td>X</td>
<td>RO0670731</td>
<td>Principal Investigator</td>
<td>Collect and analyze data</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Devis J. Glassman, PhD</td>
<td>X</td>
<td>RO0237753</td>
<td>Co-Investigator</td>
<td>Assists with analyzing data and acts as a resource for this dissertation</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
E. CONFLICT OF INTEREST

All Study Personnel listed in Section D must submit a completed a Financial Conflict of Interest (COI) Form.

Form link - RSP102 (Faculty/Staff Financial Disclosure Form for Sponsored Projects)

Is there any real or apparent conflict of interest on the part of any study personnel (e.g., stock or stock options, interest in technology, consultant to sponsor)? Yes ☐ No X

If yes, please explain

F. METHODS AND PROCEDURES

The Methods & Procedures information must be typed into the boxes below. Separate attachments will not be accepted. The information must be written in layman's terms so that it can be understood by all members of the IRB regardless of discipline. Include sufficient detail so that the scope of your project can be understood but not as extensive as would be expected in a grant proposal or journal article. Please do not include technical jargon, references or citations and do not cut and paste from other documents.

1. Describe briefly the background and significance of the study.

The purpose of the current study is to assess the Integrated Behavioral Model (IBM) and its ability to predict binge drinking among college students. Binge drinking is defined as five or more alcoholic beverages for a man (four or more drinks for a woman) on one occasion in the past two weeks (Wobuler et al., 2002). Using this definition, multiple national assessments of college students all concur that the national binge rate for 4-year colleges is approximately 44%. Many articles have described the importance of the development of prevention programs to decrease this rate. Glanz et al. (2009) stress the importance of using behavioral science theories as a guide in the development of program components. The IBM is a newer model that has not yet been tested or reported on in the literature and this assessment would be the first of its kind at the collegiate level.

2. What is the objective of the study?

Using the Integrated Behavioral Model as a guide, the objective of this study is to assess college student’s attitudes, perceptions, and behavioral intentions towards binge drinking.

3. Describe the study design and all procedures (sequentially) to which human subjects will be exposed.
This study will use randomly selected undergraduate classes obtained from the registrar. Included in this randomized list are all undergraduate classes offered at this university with the exception of online classes. Of the 40 classes chosen, the instructors of these classes will receive an email from the principal investigator (see attachment) explaining the nature of this study and requesting permission to enter their class and distribute this survey. Professors who do not respond to this email will receive a follow-up phone call asking for permission to use their class in this research project. It will be up to the instructor whether permission is granted. If permission is granted, the principal investigator will read a prepared script to the class (see attachment) and then distribute the surveys to the students. Because of the nature of this research project, anonymity is not possible; rather confidentiality will be stressed by the principal investigator. Each student will receive a survey in a brown, unmarked envelope. If the student chooses to complete the survey, they will open the envelope, sign the informed consent form, and answer the questions on the survey. After completion of the survey, they will detach the consent form from the survey, place the completed survey back in the brown envelope, seal it, and bring it to the front of the classroom. The student will then place the sealed envelope into a locked box and the signed consent form in a separate envelope. If the student chooses not to complete the survey, he or she can place the brown envelope in the locked box located at the front of the classroom.

The instructor for each class will decide whether the surveys are distributed at the beginning or the end of the class period. This confidential survey should take approximately 10 minutes to complete. Each instructor will receive, as an incentive, a $5 gift card to Starbucks for allowing us the use of their class to obtain this data.

<table>
<thead>
<tr>
<th>G. DATA COLLECTION METHODS</th>
<th>Please check or fill in the appropriate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Surveys, Questionnaires, Interview Questions (go to A)</td>
<td>Record, Database (go to B)</td>
</tr>
</tbody>
</table>

- Other Briefly explain:

A. Surveys, Questionnaires, Interview Questions A copy of each survey, questionnaire or interview must be attached to this application.

1. Describe the setting and mode of administration for the instrument (e.g., phone, one-on-one, group, internet, e-mail) and the provisions for maintaining privacy and confidentiality (e.g. anonymity). Include duration, intervals of administration, and overall length of participation.

   The students will complete the confidential survey (paper/pencil) in various classrooms at UT. No identifiers will be collected. Each student will receive their own survey in a brown envelope. After completion, each student will place their survey back in the envelope, seal it, and place it in a locked box located at the front of the classroom. If the student chooses not to participate, they can place the brown envelope and unmarked survey in the locked box. The survey should take approximately 10 minutes to complete.

B. Records or Data Review This includes existing material such as archival records, databases etc.
1. What kinds of records will you review? What is the source of the records?
N/A

2. Will you have contact or interaction with the subjects from whom the data are collected?
N/A

3. Will you be recording identifiers (information that could potentially identify human subjects)?
N/A

4. What is the timeframe of the records that you plan to review? Please define the time span.
(Example: from 2/1/2007 – 2/1/2008)
N/A

H. RISK/BENEFIT ASSESSMENT

1. Describe in detail any potential risks/ adverse events associated with each intervention or research procedure using the table below. Assess the degree of risk and likelihood of such risks (low, moderate, high).

<table>
<thead>
<tr>
<th>Potential Risks/Adverse Events</th>
<th>Degree of Risk</th>
<th>Likelihood of Adverse Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>(psychological, social, economic, legal)</td>
<td>(minimal, more than minimal)</td>
<td>(low, moderate, high)</td>
</tr>
<tr>
<td>Psychological</td>
<td>More than minimal</td>
<td>Low</td>
</tr>
<tr>
<td>Social</td>
<td>More than minimal</td>
<td>Low</td>
</tr>
<tr>
<td>Economical</td>
<td>More than minimal</td>
<td>Low</td>
</tr>
<tr>
<td>Legal</td>
<td>More than minimal</td>
<td>Low</td>
</tr>
</tbody>
</table>

2. What is the investigator’s overall assessment of the risk classification of the study? (none, minimal, or more than minimal risk)?

According to 45 CFR 46.102(j), Minimal risk means that the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

More than minimal – the students will complete a survey which might cause them to reflect on their own drinking behaviors or consequences due to their drinking. Because of this, the student could relive an experience they might attempt to suppress or hide.

3. What procedures will be utilized to prevent/minimize any potential risks or discomforts (physical, social, psychological, economic, and legal)?

The use of confidentiality. The investigators will make every attempt to keep confidential all individual answers to the questionnaire.

4. Describe the potential direct benefits subjects may receive as a result of their participation.

They may realize they drink too much and make attempts to minimize their drinking.

5. Describe the potential benefits to society that may be expected from this research. Societal benefits generally refer to the advancement of scientific knowledge, and/or possible benefit(s) to future subjects.

One benefit might be the development of prevention programs to decrease binge drinking by targeting certain at risk populations based on the results of this survey.

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6. Explain how the benefits of this research outweigh the potential risks and how these risks are justified.

Although more than minimal risks could occur to the student completing this survey, I believe the benefits of understanding why college students binge drink using this new model outweigh the risks of not performing this research project.

I. HUMAN RESEARCH SUBJECTS

Subject Population – Please request approval for a sufficient number of subjects to ensure valid data requirements. Your enrollment will be limited to the number of subjects requested.

PLEASE NOTE: If at any time you desire to add more subjects beyond those initially approved, you must first submit an Amendment for IRB review and approval. The SBE IRB Amendment form can be located at http://www.utoledo.edu/research/RC/IRBforms.html

| Total number (maximum) of subjects you are requesting to enroll: | 1000 |
| What is the gender of the subjects? | □ Male | □ Female | X Both |
| What is the subject age category? | □ Minors (less than 18 years) | X Adults (older than 18 years) | □ Both |

Please describe the subject age group as specifically as possible. (Example: minors, male and female high school students, 14-17 yrs or adult, females, 50-60 yrs)

Male and female undergraduate college students.

1. To what health category will the human subjects belong? (Example: general population, healthy adult, children with histories of depression)

General undergraduate student college population.

2. What will be the total duration of involvement for each subject in the study? (Example: one, 15-minute interview; three, 10-minute surveys; one questionnaire, approximate completion time of 1 hour)

The survey should take approximately 10 minutes to complete.

3. Is the research limited to any particular age, gender, ethnic, or racial group? (If an equitable recruitment from all sub-populations is not anticipated, please provide justification for weighted/targeted sampling)

Recruitment is limited to undergraduate students who are 18 or older.

4. Will any of the following vulnerable populations be targeted for subject recruitment?

☐ Minors ☐ Minorities ☐ Fetuses ☐ Pregnant women
5. What safeguards are in place to protect vulnerable populations involved within the proposed research?

N/A

6. Outline the criteria for selection and exclusion of subjects.

The exclusions of subjects will be those who are not in the randomly chosen classes as well as those participating in online classes. All others in the randomly chosen classes will be included in the study. However, their option to participate is voluntary and they can refuse to complete the survey in the classroom.

7. Will subjects receive compensation for their participation, monetary or otherwise? Yes ☐ No X
   If yes, please specify.

8. What financial obligations will subjects incur as a result of participating in this research? Identify expenses such as travel costs, parking fees, missed work, etc. Please be as specific as possible.

N/A

---

### J. RECRUITMENT PROCEDURES

1. What method(s) will be used to identify and recruit prospective subjects? Specify the source of potential subjects.

We will contact the registrar and ask them to randomly select 40 classes from all undergraduate classes offered on the main campus. Online classes will be excluded from this sample. The students in these randomly chosen classes will represent the subjects for this study.

2. Check all types of recruitment material that will be utilized in the study.

<table>
<thead>
<tr>
<th>Advertisements</th>
<th>Newsletters</th>
<th>Internet</th>
<th>E-Mail</th>
<th>Brochures</th>
<th>Radio</th>
<th>Contact letters to students or clients</th>
<th>Flyers/posters</th>
<th>None</th>
<th>X Other (Describe) - Registrar</th>
</tr>
</thead>
</table>

Copies of all recruitment materials must be attached to this application.
3. Will you access existing stored data, records, etc. for your recruitment purposes? If yes, specify the source.

N/A

### K. THE INFORMED CONSENT AND ASSENT PROCESS

A Consent document is required from all adult research participants unless specifically waived by the IRB. An Assent document is required of all minor research participants (age 9-17) unless specifically waived by the IRB. Complete the applicable section and attach a copy of all Consent and Assent forms that will be used for this study.

The UT DHRP has provided a template containing the elements of informed Consent/Assent (per 45 CFR 116) on the SBE IRB forms page http://www.utoledo.edu/research/RC/HumanSubs/SBEforms.html Using the template is strongly suggested in order to eliminate errors and revisions.

<table>
<thead>
<tr>
<th>K-1. Written and Signed Informed Consent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Federal regulations, (45 CFR 46.117), informed consent shall be documented by the use of a written consent form approved by the IRB and signed by the subject or the subject’s legally authorized representative. A copy shall be given to the person signing the form.</td>
</tr>
</tbody>
</table>

1. How and where will informed consent be obtained?

Informed consent will be obtained from the students in the individual classrooms. If the student chooses to participate, he or she will sign a consent form which will be a separate document from the survey instrument.

2. When will the potential subjects be approached for consent and by whom?

By the principal investigator at the chosen time by the instructor of that class.

3. Will there be an opportunity for potential subject to take consent form home to consider the options and to discuss participation with family members. If not, explain why.

The subjects will not have an opportunity to take the consent form home since they will be in class. They do, however, have the option of not participating if they so choose.

4. If subjects are minors or mentally disabled, describe how and by whom permission will be granted?

N/A

5. How and by whom will it be determined that the subjects or their legally authorized representatives understand the research project and their rights as participants?
At the time of survey administration, the subjects themselves will determine if they understand their rights as participants. They will also have an opportunity to ask questions if they choose.

6. Where will the record of consent be stored?

In the principal investigator’s office, in a locked file cabinet.

7. Please list all study personnel who will obtain consent. (Enter additional rows as needed.)

Robert E. Braun, MPH, CHES

K-2. Waiver of Written Informed Consent (A waiver of the documentation requirement.)

The IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds the following two requirements. If you are requesting a waiver of written consent, please provide justification in the space below that both of the conditions have been met. The informed consent process must still occur and an altered (short form) explanation of the research is required. Attach a copy of the cover memo or information sheet that will be distributed to subjects.

1. The only record linking the subject and the research would be the consent document and the principal risk would be the potential harm resulting from a breach in confidentiality. Each subject will be asked whether they want documentation linking them to the research. The subject’s wishes will govern.

Justification:

AND

2. That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

Justification:

K-3. Alteration or Waiver of Consent

The IRB may waive the requirements to obtain informed consent provided the IRB finds and documents the following four items. If you are requesting a waiver of the consent requirement, please provide justification in the spaces below that each of the four conditions has been met.

1. The research involves no more than minimal risk to the subjects.

2. The waiver or alteration will not adversely affect the rights and welfare of the subjects.
3. The research could not practicably be carried out without the waiver or alteration; and

4. Whenever appropriate, the subjects will be provided with additional pertinent information after their participation.

### L. CONFIDENTIALITY OF INFORMATION COLLECTED

1. **What are the methods used to ensure confidentiality of participation?**
   
   *No identifiable marks will be placed on (or required) the completed survey forms by students or the principal investigator.*

2. **How will data be collected and recorded?**
   
   *This data will be collected via paper and pencil on a 3-page stapled packet.*

3. **Where will data be stored during the study and how will they be secured?**
   
   *The data will be stored in the principal investigator's office in a locked file cabinet.*

4. **Who will have access to the data and/or to coding schemes?**
   
   *Principal investigator and co-investigator only.*

5. **If data with identifiers will be released, specify the person(s) or agency to whom this information will be released?**
   
   *N/A*

6. **What will happen to the raw data when the research is completed?**
   
   *Destroyed*
We assure that the information provided in this application is complete and accurate.

- We understand that as the Principal Investigator or Faculty Advisor AND the Student Investigator, we have responsibility for the protection of the rights and welfare of human subjects and the strict adherence to any study-specific requirements imposed by the IRB.

- We agree to comply with all IRB and institutional policies and procedures, as well as with all applicable federal, state and local laws and regulations regarding the protection of human subjects in research and the conduct of clinical research.

- We agree to:
  1. accept responsibility for the scientific and ethical conduct of this research study,
  2. obtain prior approval from the Institutional Review Board before amending or altering the research protocol or implementing changes in the approved consent/assent form, study sites or study personnel, recruitment procedures,
  3. immediately report to the IRB any serious adverse events and/or unanticipated effects on subjects which may occur as a result of this study,
  4. train study personnel in the proper conduct of human subjects research,
  5. complete the Continuing Review and Final Report Forms required by the UT SBE IRB,

- We attest that all above named study personnel have read the protocol, understand the study, and are fully knowledgeable of all details of the protocol and are able to answer all questions from research subjects such as risks and alternatives. The study personnel so designated in Section D. may obtain informed consent from research subjects.
N. APPLICATION ENCLOSURES CHECKLIST - Please use the following checklist to assure application completeness. Incomplete applications will be returned for revision.

All of the following items should be included in your initial review application packet:

- 1 Complete IRB Application, with original signatures (Section M Assurances) AND 1 Electronic copy sent via email to SBE IRB@utoledo.edu.
- CITI Human Subjects Research Training checked as completed (Section D, Study Personnel). The application will not be reviewed until all training is complete.
- UT Faculty/Staff Conflict-of-Interest Form for all study personnel

Include the following if applicable:

- Current IRB Approval letters from other performance sites. (Section C.)
- Approval letters from all sites (on site letterhead) where research will be conducted. (Section C.)
- Research Instruments (Section G: surveys, questionnaires, interview questions or other instruments)
- Recruitment Information (Section J: Advertisements, Flyers, Web postings, letters etc.)
- Consent/Assent forms, if applicable. (Section K.)
- Additional information the PI considers important for review by the UT SBE IRB.
Appendix C

Informed Consent Document
ADULT RESEARCH SUBJECT - INFORMED CONSENT FORM
Using the Integrated Behavioral Model to Predict Binge Drinking among College Students

Principal Investigator:
Rob Braun, MPH, CHES, Doctoral Graduate Assistant, 410.530.2743
Tavis Glassman, PhD, MPH, MCHES, Assistant Professor of Health Education, 410.530.2770

Purpose: You are invited to participate in the research project entitled, Using the Integrated Behavioral Model to Predict Binge Drinking among College Students, which is being conducted at the University of Toledo under the direction of Rob Braun and Tavis Glassman. The purpose of this study is to assess college student’s attitudes, perceptions, and behavioral intentions towards binge drinking.

Description of Procedures: This research study will take place in randomly chosen classrooms either on the main campus or health science campus of the University of Toledo. The answers to this survey will be kept confidential. You will complete one survey, which will take approximately 10 minutes to complete. Along with this informed consent form, a survey has been placed in this envelope. Please follow the directions on the survey and answer the various questions assessing your drinking behavior. After completion, place the completed survey back in the envelope, seal it, and place it in the large box at the front of the classroom. This box is locked and will not be opened until it is time for data entry. Please keep this form and place it in a separate brown envelope which is located next to the box.

After you have completed your participation, the research team will debrief you about the data, theory and research area under study and answer any questions you may have about the research.

Potential Risks: There is a more-than-minimal risk to participation in this study, including loss of confidentiality. You can participate as much as you like or stop answering the questions if you feel upset, anxious, or uncomfortable due to the nature of these questions.

Potential Benefits: The only direct benefit to you if you participate in this research may be that you will learn about how research survey studies are performed. You may also learn more about your own drinking habits. Others may benefit by learning about the results of this research.

Confidentiality: The researchers will make every effort to prevent anyone who is not on the research team from knowing that you provided this information, or what that information is. The consent forms with signatures will be kept separate from responses, which will not include names and which will be presented to others only when combined with other responses. Although we will make every effort to protect your confidentiality, there is a low risk that this might be breached. This point will be reiterated when the principal investigator hands out the brown envelopes and when all the surveys have been turned in.

University of Toledo IRB Approved
Approval Date: 05/13/11
Expiration Date: 05/12/12

Adult Informed Consent Revised 11.05.10
Voluntary Participation: Your refusal to participate in this study will involve no penalty or loss of benefits to which you are otherwise entitled and will not affect your relationship with The University of Toledo or any of your classes. In addition, you may discontinue participation at any time without any penalty or loss of benefits.

Contact Information: Before you decide to accept this invitation to take part in this study, you may ask any questions that you might have. If you have any questions at any time before, during or after your participation or experience any physical or psychological distress as a result of this research, you should contact a member of the research team – either Rob Braun (419) 530-2743 or Tavis Glaseman (419) 530-2770.

If you have questions beyond those answered by the research team or your rights as a research subject or research-related injuries, the Chairperson of the SBE Institutional Review Board may be contacted through the Office of Research on the main campus at (419) 530-2844.

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

SIGNATURE SECTION – Please read carefully

You are making a decision whether or not to participate in this research study. Your signature indicates that you have read the information provided above, you have had all your questions answered, and you have decided to take part in this research.

The date you sign this document to enroll in this study, that is, today's date must fall between the dates indicated at the bottom of the page.

Name of Subject (please print) ___________________________ Signature ___________________________ Date ____________

Name of Person Obtaining Consent ___________________________ Signature ___________________________ Date ____________

This Adult Research Informed Consent document has been reviewed and approved by the University of Toledo Social, Behavioral and Educational IRB for the period of time specified in the box below.

Approved Number of Subjects: ___________________________
Appendix D

Survey Instrument
Directions: Please answer the questions below as they relate to your behavior or perceptions. Even if you do not drink alcohol, please answer these questions to the best of your ability. Your responses are confidential. Thank you for your participation!

1. What is your gender? ☐ Male ☐ Female
2. What year were you born? 19 [ ]
3. What year are you in school? ☐ 1st year ☐ 2nd year ☐ 3rd year ☐ 4th year ☐ 5th year
4. How do you describe yourself? ☐ African American (Black)
   ☐ American Indian/Alaskan Native
   ☐ Asian or Pacific Islander
   ☐ Caucasian (White)
   ☐ Hispanic (Latino)
   ☐ Other (please specify): ________________________________
5. Are you currently a member of a Greek fraternity or sorority (IFC, NPHC, PC, MGC)? ☐ No ☐ Yes
6. Are you a member of an official NCAA team? ☐ No ☐ Yes
7. Do you participate in intramural/club sports? ☐ No ☐ Yes

For the following questions, one drink is defined as 12 oz. of beer, 12 oz/ of wine cooler, 5 oz. of wine, 1.25oz. of liquor either straight or in a mixed drink.

8. What is the total number of hours you spent drinking the last time you partied/socialized? [Please write 0 if you do not drink]. [ ]

9. How many alcoholic drinks did you have the last time you "partied"/socialized? [ ]

10. During the past two weeks, how many times did you have five or more drinks on one occasion (four or more drinks for a female)? [ ]

11. Estimate approximately how many alcoholic drinks it takes for you to become drunk? [ ]

12. What type of alcohol do you usually drink when you party/socialize?
   ☐ beer ☐ wine ☐ wine cooler ☐ liquor ☐ other (please specify): ________________________________

13. What is your current enrollment status? ☐ Part-time ☐ Full-time
Please use this definition of "binge drinking" when answering the following questions. Binge drinking is defined as having 5 or more drinks on one occasion for men (4 or more drinks for women) during the previous two weeks.

14. During the last 30 days, how many times did you experience the following due to binge drinking?

If you have not binge drank in the last 30 days, check here ___ and go to question 15.

- Had a hangover: ___ times in the last 30 days
- Vomited: ___ times in the last 30 days
- Drove after drinking alcohol: ___ times in the last 30 days
- Drove after binge drinking: ___ times in the last 30 days
- Had a memory loss (blackout): ___ times in the last 30 days
- Was hurt or injured: ___ times in the last 30 days
- Got into a fight or an argument: ___ times in the last 30 days
- Arrested by the police: ___ times in the last 30 days
- Got reprimanded by the police: ___ times in the last 30 days
- Had unprotected sex: ___ times in the last 30 days
- Took advantage of someone sexually: ___ times in the last 30 days
- Had been taken advantage of sexually: ___ times in the last 30 days

15. Please "X" in the column that shows your perceptions towards binge drinking:

16. Please shade in the circle that indicates your level of agreement or disagreement with each of the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Uncertain</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>People who are important to me would approve of me binge drinking:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My friends encourage me to binge drink:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>People whose opinion I value support my decision to binge drink:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>People who matter to me expect me to binge drink:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My best friend binge drinks when he or she parties:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Most of my friends binge drink when they party:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Most UT college students binge drink when they party:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Nationally, most college students binge drink when they party:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

17. Please indicate the extent to which the following questions are under your control by shading in the appropriate circle:

<table>
<thead>
<tr>
<th>Action</th>
<th>Totally Under my Control</th>
<th>Neither</th>
<th>Totally Under my Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstaining from alcohol is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Limiting my alcohol consumption is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Binge drinking is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Turning down offers to get drunk with my friends is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Refusing another drink once I start consuming alcohol is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

18. Please shade in the circle that indicates your level of difficulty or ease in performing each of the following statements:

<table>
<thead>
<tr>
<th>Action</th>
<th>Very Difficult</th>
<th>Neither</th>
<th>Very Easy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring how much I binge drink is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Controlling whether I binge drink is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Refusing to binge drink is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Dealing with peer pressure regarding binge drinking is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Limiting my alcohol consumption when I have responsibilities the next day is:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
19. Please shade in the circle that indicates your level of agreement or disagreement with each of the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Neither</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The presence of police officers reduces binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Raising the price of alcohol reduces binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Seeing and hearing alcohol advertisements increases binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Drink specials (e.g., Happy Hour or $1 well drinks) increases binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>House parties, where alcohol is free or inexpensive, increases binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Bars with special events (e.g., Eighties Night or Kegs 'n Eggs) increases binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Having bars/clubs close to campus increases binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The closer the bar is to one's residence increases binge drinking among college students:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

20. Please shade in the circle that indicates your likelihood of performing each of the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Very Likely</th>
<th>Neither</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will abstain from drinking alcohol in the next two weeks:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I intend to binge drink in the next two weeks:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I am making plans to get drunk in the next two weeks:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I expect to binge drink in the next two weeks:</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Do you have any comments you would like to share regarding drinking alcohol?

Thank you very much for filling out this survey! When you are finished, please place the survey in the brown envelope, seal it, bring it to the front of the classroom and place it in the brown box.
Appendix E

Elicitation Questions for Focus Groups
Questions for
“An Elicitation Study Identifying Salient Issues in High-Risk Drinking”
Focus Groups

1. Experiential Attitude
   a. How do you feel about the idea of engaging in binge drinking?
   b. What do you like about binge drinking?
      i. What do you enjoy most about binge drinking?
   c. What do you dislike about binge drinking?
      i. What do you hate most about binge drinking?

2. Instrumental Attitude
   a. What are some advantages of binge drinking?
      i. What are some benefits that might result from binge drinking?
   b. What are some disadvantages of binge drinking?
      i. What are the negative effects that might result from binge drinking?

3. Injunctive Norms
   a. Who would encourage you to binge drinking?
   b. Who would discourage you from binge drinking?

4. Perceived Control (External)
   a. Under what circumstances are you able to moderate or abstain from drinking?
      i. What makes it easier to control your drinking?
   b. Under what circumstances do you drink too much?
      i. What makes it difficult to control your drinking?

5. Self-Efficacy (Internal)
   a. To what extent are you confident in your ability to control your drinking?
   b. If your friends were pressuring you to drink heavily how difficult would it be to abstain from consuming alcohol?
   c. If your friends were pressuring you to drink heavily how difficult would it be to drink moderately?
Appendix F

IRB Proposal for Focus Groups
# Social, Behavioral & Educational Research Protocol Application

This application must be completed electronically and saved as a new document, please do not complete by hand.

## A. STUDY INFORMATION

<table>
<thead>
<tr>
<th>Date of Submission:</th>
<th>1-20-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRB Number &amp; Category:</td>
<td>X Expedited</td>
</tr>
<tr>
<td></td>
<td>❑ Convened</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study Title:</th>
<th>Alcohol Use among College Students</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Intended purpose for this application:</th>
<th>❑ Master Thesis</th>
<th>❑ PhD Dissertation</th>
<th>❑ Course requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>❑ Scholarly presentation</td>
<td>❑ Scholarly dissemination</td>
<td>❑ Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Principal Investigator:</th>
<th>Tavis J. Glassman, PhD, MPH, CHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocket ID #:</td>
<td>R00297753</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department:</th>
<th>Health and Recreation Professions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office #:</td>
<td>1006</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phone #:</th>
<th>X2770</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT Email:</td>
<td><a href="mailto:tavis.glassman@utoledo.edu">tavis.glassman@utoledo.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Investigator:</th>
<th>Robert E. Braun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocket ID #:</td>
<td>R00670731</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student's Phone #:</th>
<th>240-593-6251</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT Email:</td>
<td><a href="mailto:Robert.braun@rockets.utoledo.edu">Robert.braun@rockets.utoledo.edu</a></td>
</tr>
</tbody>
</table>

## B. STUDY FUNDING

<table>
<thead>
<tr>
<th>Funding Status:</th>
<th>❑ Funded</th>
<th>❑ Unfunded</th>
<th>❑ Pending</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Funding Source:</th>
<th>❑ Intramural</th>
<th>❑ *Extramural</th>
</tr>
</thead>
</table>

*If Extramurally funded, please complete the following:

---

159
C. PERFORMANCE SITE(S)

List all sites at which you will conduct this research. Attach permission letters on site letterhead and/or current IRB approval memos for off-campus sites. Check box if site is “engaged in research.” A site becomes “engaged” in human subjects research when its employees or agents: (i) intervene or interact with living individuals for research purposes; or (ii) obtain individually identifiable private information for research purposes [45 CFR 46.102(d),(f)].

<table>
<thead>
<tr>
<th>Performance Site Name</th>
<th>Address</th>
<th>Engaged in research</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Toledo</td>
<td>2801 W. Bancroft Ave., MS#119</td>
<td>Yes</td>
</tr>
</tbody>
</table>

D. STUDY PERSONNEL

Please list all study personnel involved in the conduct of this study. Anyone who is “engaged in research” must be listed below. This includes all study personnel who, for research purposes, interact or intervene with subjects, have access to subjects’ identifiable private information or obtain informed consent of subjects. This list may be different (often longer) than the key personnel list included in a grant.

Check the box under UT for each person who is affiliated with UT. Only UT faculty, staff, students, or registered volunteers are considered “UT-affiliated” and thus covered by the UT IRB review. All non-affiliated study personnel must have their participation reviewed by the appropriate IRB and cannot begin activities until their IRB approval is on file.

As of July 2010, all new study personnel must complete human subject research training via the UT CITI training site. Training information can be accessed at http://www.utoledo.edu/researchVRC/HumanSubs/training.html. If you completed the former UT training program prior to July 2010, your existing education will remain valid until renewal training requirements are implemented.

The IRB does not review research applications until all research personnel have completed their training.
<table>
<thead>
<tr>
<th>FIRST/LAST NAME</th>
<th>UT</th>
<th>ROCKET ID #</th>
<th>PARTICIPANT'S TITLE IN THIS RESEARCH</th>
<th>PARTICIPANT'S ROLE IN THIS RESEARCH</th>
<th>TRAINING COMPLETE</th>
<th>COI FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tava J. Glassman, PhD</td>
<td>X</td>
<td>R00237751</td>
<td>*Principal Investigator</td>
<td>*Explain informed consent</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Robert E. Braun, MPH, CHES</td>
<td>X</td>
<td>R00670731</td>
<td>*Co-Investigator</td>
<td>*Conduct Interviews</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*Other participant titles include: Data/Clerical Support, Graduate Research Assistant, Research Associate and Statistician. Please DELETE all non-applicable examples (in gray boxes) when filling in table.

E. CONFLICT OF INTEREST

All Study Personnel listed in Section D must submit a completed a Financial Conflict of Interest (COI) Form.

Form link - RSP102 (Faculty/Staff Financial Disclosure Form for Sponsored Projects)

Is there any real or apparent conflict of interest on the part of any study personnel (e.g., stock or stock options, interest in technology, consultant to sponsor)? Yes □ No X

If yes, please explain

F. METHODS AND PROCEDURES

The Methods & Procedures information must be typed into the boxes below. Separate attachments will not be accepted. The information must be written in layman’s terms so that it can be understood by all members of the IRB regardless of discipline. Include sufficient detail so that the scope of your project can be understood but not as extensive as would be expected in a grant proposal or journal article. Please do not include technical jargon, references or citations and do not cut and paste from other documents.

1. Describe briefly the background and significance of the study.
The purpose of the study is to assess the Integrated Behavioral Model (IBM), and its ability to predict high-risk drinking among college students. In order to accomplish this, an assessment tool needs to be developed. Focus groups will be held to elicit information that will help with the development of a survey assessing students’ motivations concerning high-risk drinking.

2. What is the objective of the study?
To elicit information using focus groups in order to help with the development of a survey tool.

3. Describe the study design and all procedures (sequentially) to which human subjects will be exposed.

Interested students will sign-up for one of six focus groups offered. These students will be recruited from various HEAL classes offered at this University. Pizza and pop (incentives) will be offered for those who participate. Six questions will be asked during the 90 minute session. Students will be briefed on the purpose and goals of this study. To ensure confidentiality, names will not be asked for before the session; rather, individual sign-in sheets with demographic questions will be distributed to those participating in the focus groups. Questions will include age, race/ethnicity, class level, gender, and major. Likewise, before the focus groups begin, each individual participant will complete an informed consent document. This document will inform the participant about the study, and the confidentiality involved. Individual’s names will not be used during the focus group.

<table>
<thead>
<tr>
<th>G. DATA COLLECTION METHODS</th>
<th>Please check or fill-in the appropriate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Surveys, Questionnaires, Interview Questions (go to A)</td>
<td>□ Record, Database (go to B)</td>
</tr>
</tbody>
</table>

A. Surveys, Questionnaires, Interview Questions A copy of each survey, questionnaire or interview must be attached to this application.

2. Describe the setting and mode of administration for the instrument (e.g., phone, one-on-one, group, internet, e-mail) and the provisions for maintaining privacy and confidentiality (e.g. anonymity). Include duration, intervals of administration, and overall length of participation.

Data collected via focus groups. At the time of the focus group, each individual participant will complete their own demographic worksheet which, upon completion, will be placed in a sealed box. These focus groups should last no longer than 90 minutes.

B. Records or Data Review This includes existing material such as archival records, databases etc.

5. What kinds of records will you review? What is the source of the records?
6. Will you have contact or interaction with the subjects from whom the data are collected?

7. Will you be recording identifiers (information that could potentially identify human subjects)?

8. What is the timeframe of the records that you plan to review? Please define the time span. (Example: from 2/1/2007 – 2/1/2008)

H. RISK/BENEFIT ASSESSMENT

1. Describe in detail any potential risks/adverse events associated with each intervention or research procedure using the table below. Assess the degree of risk and likelihood of such risks (low, moderate, high).

<table>
<thead>
<tr>
<th>Potential Risks/Adverse Events</th>
<th>Degree of Risk (minimal, more than minimal)</th>
<th>Likelihood of Adverse Events (low, moderate, high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological</td>
<td>Minimal</td>
<td>Low</td>
</tr>
<tr>
<td>Social</td>
<td>Minimal</td>
<td>Low</td>
</tr>
<tr>
<td>Economical</td>
<td>Minimal</td>
<td>Low</td>
</tr>
</tbody>
</table>

2. What is the investigator's overall assessment of the risk classification of the study? (none, minimal, or more than minimal risk)?

According to 45 CFR 46.102(b), Minimal risk means that the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

Minimal – the students will be asked questions that they can freely answer. Additionally, at the beginning of each focus group, the moderator will discuss the participants the reason for confidentiality, and not to discuss what was said during the meeting outside or anywhere else. However, confidentiality may be compromised if a student, after participating in the focus group, decides to talk about that person's experiences and discussions held.

3. What procedures will be utilized to prevent/minimize any potential risks or discomforts (physical, social, psychological, economic, and legal)?

Confidentiality will be ensured. All individually completed documents associated with these focus groups, including individual demographic surveys and consent forms, will be kept in a locked file cabinet in the principal or student investigator’s office.

4. Describe the potential direct benefits subjects may receive as a result of their participation.

They may realize they drink too much and make attempts to minimize their drinking.

5. Describe the potential benefits to society that may be expected from this research. Societal benefits generally refer to the advancement of scientific knowledge, and/or possible benefits to future subjects.

One benefit would include the development of prevention programs designed to decrease high-risk drinking.

6. Explain how the benefits of this research outweigh the potential risks and how these risks are justified.
Since there are only minimal risks, I believe the benefits of understanding why college students binge drinking using focus groups outweigh the risks of not performing this research project.

I. HUMAN RESEARCH SUBJECTS

Subject Population – Please request approval for a sufficient number of subjects to ensure valid data requirements. Your enrollment will be limited to the number of subjects requested.

PLEASE NOTE: If at any time you desire to add more subjects beyond those initially approved, you must first submit an Amendment for IRB review and approval. The SBE IRB Amendment form can be located at http://www.utdallas.edu/research/RC/HumanSubjects/SBEForms.html

<table>
<thead>
<tr>
<th>Total number (maximum) of subjects you are requesting to enroll:</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the gender of the subjects?</td>
<td>□ Male</td>
</tr>
<tr>
<td>What is the subject age category?</td>
<td>□ Minors (less than 18 years)</td>
</tr>
</tbody>
</table>

Please describe the subject age group as specifically as possible. (Example: minors, male and female high school students, 14-17y/o or adult, females, 50-60 y/o) Male and female college students aged 18 - 24

1. To what health category will the human subjects belong? (Example: general population, healthy adult, children with histories of depression)
   General undergraduate student population

2. What will be the total duration of involvement for each subject in the study? (Example: one, 15-minute interview; three, 10-minute surveys; one questionnaire, approximate completion time of 1 hour)
   One 90-minute group interview

3. Is the research limited to any particular age, gender, ethnic, or racial group? (If an equitable recruitment from all sub-populations is not anticipated, please provide justification for weighted/targeted sampling. This research is limited to undergraduate students aged 18 – 24 only.

4. Will any of the following vulnerable populations be targeted for subject recruitment?

<table>
<thead>
<tr>
<th>Minors</th>
<th>Minorities</th>
<th>□ Fetuses</th>
<th>Pregnant women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prisoners</td>
<td>Mentally incapacitated</td>
<td>□ Terminally Ill</td>
<td>non-English speaking</td>
</tr>
<tr>
<td>Elderly</td>
<td>Severe psychological disorders</td>
<td>X UT students</td>
<td>UT staff</td>
</tr>
</tbody>
</table>
5. What safeguards are in place to protect vulnerable populations involved within the proposed research?
Participants who are under the age to legally consume alcohol will not be held accountable for their comments during this focus group, nor will their names be given to the police.

6. Outline the criteria for selection and exclusion of subjects.
Participation is voluntary.

7. Will subjects receive compensation for their participation, monetary or otherwise? Yes X No
If yes, please specify.
They will receive pizza and pop as an incentive for their time and effort.

8. What financial obligations will subjects incur as a result of participating in this research?
Identify expenses such as travel costs, parking fees, missed work, etc. Please be as specific as possible.
N/A

---

### J. RECRUITMENT PROCEDURES

1. What method(s) will be used to identify and recruit prospective subjects? Specify the source of potential subjects.
The source of potential subjects will include students in certain HEAL classes. This researcher will go to some HEAL classes and attempt to recruit subjects by explaining the research and related food incentives.

2. Check all types of recruitment material that will be utilized in the study.

<table>
<thead>
<tr>
<th>Advertisements</th>
<th>Newsletters</th>
<th>Internet</th>
<th>E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brochures</td>
<td>Radio</td>
<td>Contact letters to students or clients</td>
<td></td>
</tr>
<tr>
<td>Flyers/posters</td>
<td>None</td>
<td>X Other (Describe) – going from class to class in an attempt to recruit subjects</td>
<td></td>
</tr>
</tbody>
</table>

Copies of all recruitment materials must be attached to this application.

3. Will you access existing stored data, records, etc. for your recruitment purposes? If yes, specify the source.
### K. THE INFORMED CONSENT AND ASSENT PROCESS

A Consent document is required from all adult research participants unless specifically waived by the IRB. An Assent document is required of all minor research participants (age 9-17) unless specifically waived by the IRB. Complete the applicable section and attach a copy of all Consent and Assent forms that will be used for this study.

The UT DHRP has provided a template containing the elements of Informed Consent/Assent (per 45 CFR 116) on the SBE IRB forms page http://www.utoledo.edu/research/RC/HumanSubs/SBEforms.html. Using the template is strongly suggested in order to eliminate errors and revisions.

#### K-1. Written and Signed Informed Consent

*Per Federal regulations, (45 CFR 46.117)*, informed consent shall be documented by the use of a written consent form approved by the IRB and signed by the subject or the subject's legally authorized representative. A copy shall be given to the person signing the form.

<table>
<thead>
<tr>
<th>1. How and where will informed consent be obtained?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informed consent will occur just prior to conducting the focus group. Participant signatures will be collected.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. When will the potential subjects be approached for consent and by whom?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment will take place in various classrooms. The students will email the principal investigator if they want to participate. Informed consent will be solicited by the P.I. twenty minutes before the focus group begins.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Will there be an opportunity for potential subject to take consent form home to consider the options and to discuss participation with family members. If not, explain why.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. If subjects are minors or mentally disabled, describe how and by whom permission will be granted?</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. How and by whom will it be determined that the subjects or their legally authorized representatives understand the research project and their rights as participants?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The students themselves will determine if they understand the project. They can ask as many questions as they wish.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Where will the record of consent be stored?</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the primary investigators office.</td>
</tr>
</tbody>
</table>
7. Please list all study personnel who will obtain consent. *(Enter additional rows as needed.)*

Robert E. Braun & Tavis Glassman.

<table>
<thead>
<tr>
<th>K-2. Waiver of Written informed Consent <em>(A waiver of the documentation requirement.)</em></th>
</tr>
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<tbody>
<tr>
<td><strong>The IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds the following two requirements. If you are requesting a waiver of written consent, please provide justification in the space below that both of the conditions have been met. The informed consent process must still occur and an altered (short form) explanation of the research is required. Attach a copy of the cover memo or information sheet that will be distributed to subjects.</strong></td>
</tr>
<tr>
<td>1. The only record linking the subject and the research would be the consent document and the principal risk would be the potential harm resulting from a breach in confidentiality. Each subject will be asked whether they want documentation linking them to the research. The subject's wishes will govern.</td>
</tr>
<tr>
<td><strong>Justification:</strong></td>
</tr>
<tr>
<td>2. That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.</td>
</tr>
<tr>
<td><strong>Justification:</strong></td>
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<tr>
<th>K-3. Alteration or Waiver of Consent</th>
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<tbody>
<tr>
<td><strong>The IRB may waive the requirements to obtain informed consent provided the IRB finds and documents the following four items. If you are requesting a waiver of the consent requirement, please provide justification in the spaces below that each of the four conditions has been met.</strong></td>
</tr>
<tr>
<td>1. The research involves no more than minimal risk to the subjects.</td>
</tr>
<tr>
<td>2. The waiver or alteration will not adversely affect the rights and welfare of the subjects.</td>
</tr>
<tr>
<td>3. The research could not practicably be carried out without the waiver or alteration; and</td>
</tr>
<tr>
<td>4. Whenever appropriate, the subjects will be provided with additional pertinent information after their participation.</td>
</tr>
</tbody>
</table>
7. Please list all study personnel who will obtain consent. *(Enter additional rows as needed.)*

Robert E. Braun & Tavis Glassman.

---

**K-2. Waiver of Written Informed Consent (A waiver of the documentation requirement.)**

*The IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds the following two requirements: If you are requesting a waiver of written consent, please provide justification in the space below that both of the conditions have been met. The informed consent process must still occur and an altered (short form) explanation of the research is required. Attach a copy of the cover memo or information sheet that will be distributed to subjects.*

1. The only record linking the subject and the research would be the consent document and the principal risk would be the potential harm resulting from a breach in confidentiality. Each subject will be asked whether they want documentation linking them to the research. The subject's wishes will govern.

   **Justification:**

   **AND**

2. That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

   **Justification:**

**K-3. Alteration or Waiver of Consent**

*The IRB may waive the requirements to obtain informed consent provided the IRB finds and documents the following four items. If you are requesting a waiver of the consent requirement, please provide justification in the spaces below that each of the four conditions has been met.*

1. The research involves no more than minimal risk to the subjects.

2. The waiver or alteration will not adversely affect the rights and welfare of the subjects.

3. The research could not practically be carried out without the waiver or alteration; and

4. Whenever appropriate, the subjects will be provided with additional pertinent information after their participation.
| M. ASSURANCES - Principal Investigator or Faculty Advisor AND Student Investigator |

## L. CONFIDENTIALITY OF INFORMATION COLLECTED

1. **What are the methods used to ensure confidentiality of participation?**
   
   *Names will not be used during the focus groups.*

2. **How will data be collected and recorded?**
   
   *The Co-PI will take handwritten notes. We will NOT tape record the focus groups.*

3. **Where will data be stored during the study and how will they be secured?**
   
   *The data will be stored in the principal investigator's office in a locked file cabinet.*

4. **Who will have access to the data and/or coding schemes?**
   
   *Principal investigator and co-investigator only.*

5. **If data with identifiers will be released, specify the person(s) or agency to whom this information will be released?**
   
   *N/A*

6. **What will happen to the raw data when the research is completed?**
   
   *All focus group notes will be destroyed.*
We assure that the information provided in this application is complete and accurate.

- We understand that as the Principal Investigator or Faculty Advisor AND the Student Investigator, we have responsibility for the protection of the rights and welfare of human subjects and the strict adherence to any study-specific requirements imposed by the IRB.

- We agree to comply with all IRB and institutional policies and procedures, as well as with all applicable federal, state and local laws and regulations regarding the protection of human subjects in research and the conduct of clinical research.

- We agree to;

6. accept responsibility for the scientific and ethical conduct of this research study,
7. obtain prior approval from the Institutional Review Board before amending or altering the research protocol or implementing changes in the approved consent/assent form, study sites or study personnel, recruitment procedures,
8. immediately report to the IRB any serious adverse events and/or unanticipated effects on subjects which may occur as a result of this study,
9. train study personnel in the proper conduct of human subjects research,
10. complete the Continuing Review and Final Report Forms required by the UT SBE IRB,

- We attest that all above named study personnel have read the protocol, understand the study, and are fully knowledgeable of all details of the protocol and are able to answer all questions from research subjects such as risks and alternatives. The study personnel so designated in Section D. may obtain informed consent from research subjects.

<table>
<thead>
<tr>
<th>Print Name of Principal Investigator / Faculty Advisor Investigator</th>
<th>Printed Name of Student</th>
</tr>
</thead>
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<tr>
<th>Signature of Principal Investigator / Faculty Advisor Investigator</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>Signature of Student</td>
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</table>

N. APPLICATION ENCLOSURES CHECKLIST – Please use the following checklist to assure application completeness. Incomplete applications will be returned for revision.
All of the following items should be included in your initial review application packet:

- □ 1 Complete IRB Application, with original signatures (Section M Assurances) AND 1 Electronic copy sent via email to SBE_IRB@tutelado.edu
- □ CITI Human Subjects Research Training checked as completed (Section D. Study Personnel) The application will not be reviewed until all training is complete.
- □ UT Faculty/Staff Conflict-of-Interest Form for all study personnel

Include the following if applicable:

- □ Current IRB Approval letters from other performance sites. (Section C.)
- □ Approval letters from all sites (on site letterhead) where research will be conducted. (Section C.)
- □ Research Instruments (Section G. surveys, questionnaires, interview questions or other instruments)
- □ Recruitment information (Section J. Advertisements, Flyers, Web postings, letters etc.)
- □ Consent/Assent forms, if applicable. (Section K.)
- □ Additional information the PI considers important for review by the UT SBE IRB.
Appendix G

Cover Letter for Panel of Experts
Dear ________,

I am a doctoral student at the University of Toledo, working with Tavis Glassman, PhD, MPH, MCHES and am asking for your help in evaluating a questionnaire to be used in my dissertation (see attached). The primary purpose of this research is to explore the beliefs, perceptions, and attitudes of college students and binge drinking based on constructs within the Integrated Behavioral Model (IBM). The questionnaire items are as follows:

**Questions #1 – 10** pertain to background and demographic questions
**Question #11** – inquires about consequences the respondent experienced within the past 30 days.
**Question #12** - based on the Instrumental Attitude construct within the IBM.
**Question #13** - based on the Experiential Attitude construct within the IBM.
**Question #14** - based on the Injunctive Norm construct within the IBM.
**Question #15** - based on the Descriptive Norm construct within the IBM.
**Question #16** - based on the Perceived Control construct within the IBM.
**Question #17** - based on the Self-efficacy construct within the IBM.
**Question #18** - based on the Behavioral Intention construct within the IBM.

When reviewing the questionnaire, please consider doing the following:

1. Write on the survey
2. Draw a line through any question or statement that is irrelevant
3. Add any additional items or comments

I know you are busy and I greatly appreciate your time and support. Thank you in advance for your consideration of my request. Hopefully you will be able to complete the review in the next week and return it in the postage paid envelope.

Sincerely,

Robert E. Braun
Doctoral Student
Enclosure
Appendix H

Invitation Letter for Professors
April 18, 2011

Dear Professor,

My name is Rob Braun, and I am completing my PhD in Health Education here at the University of Toledo. In order to collect data for my dissertation, I need to survey college students. Historically, e-mail and mailed surveys have elicited poor response rates. Because of these poor response rates, in-class data collection is the preferred method, for which your course was randomly selected by the University’s registrar. May I please administer my brief survey to students attending your class this summer?

My dissertation, entitled "Using the Integrated Behavioral Model to Predict Binge Drinking among College Students," constitutes an issue this campus is very concerned with. Students will be assessed on alcohol related behaviors, attitudes, and perceptions associated with binge drinking. I am working with a member of the Health Education faculty on this dissertation, which received IRB approval.

This survey should take no longer than 10 minutes to complete. I prefer to administer the survey at the beginning of your class period but I am flexible.

If you are willing to assist me, I need to visit your class the week of May 16th or May 23rd.

As an incentive for helping me with this project, I will offer you a $5 gift card to Starbucks. Again, thank you for your time and your quick response to this email.

Sincerely,

Robert E. Braun, MPH, CHES
Doctoral Graduate Assistant in Health Education
The University of Toledo

&

Tavis Glassman, PhD, MPH, MCHES
Assistant Professor of Health Education/Public Health
The University of Toledo
Appendix I

Survey Protocol Instructions
Survey Protocol Instructions

I. Read the following statement:
   a. Hello, my name is Rob Braun, and I am a doctoral student working on my dissertation. The questionnaire I am about to hand out assesses students’ attitudes, beliefs, and perceptions towards binge drinking. All of your answers will be treated with the **strictest of confidence** and all analyses will look at group responses, therefore not revealing individual data.

   b. Each envelope I will hand out has its own survey. Please open the envelope and review the informed consent form on the first page of the survey. If you choose not to complete this survey, please place the survey back in the envelope, seal it, and bring it to the front of the classroom and place it in this locked box. If you choose to complete this survey, please sign the consent form. When you complete the survey, please detach the consent form from the survey and place the survey in the brown envelope, seal the envelope, and return it to the front of the classroom. Place the sealed envelope with the survey in the locked box and place the signed informed consent in the additional brown envelope next to the box. Thank you for your help.