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APPLICATION OF THE STAGES OF CHANGE IN EXPLORING FRESHMAN
COLLEGE STUDENT PERCEPTIONS AND BEHAVIORS OF BINGE DRINKING

by

Jared Tonks

A dissertation

submitted in partial fulfillment

of the requirements for the degree of

Doctor of Education in the Department of School Psychology and Educational
Leadership

Idaho State University

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Committee Approval

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September 11, 2015

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RE: Your application dated 7/29/2015 regarding study number 3841: Application of the Stages of Change in Exploring Freshman College Student Perceptions of Binge Drinking

Dear Mr. Tonks:

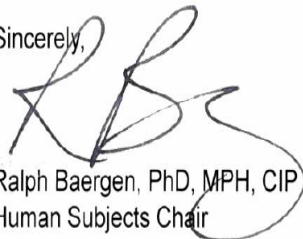
Thank you for your response to requests from a prior review of your application for the new study listed above. Your study is eligible for expedited review under FDA and DHHS (OHRP) Not eligible for expedited review designation.

This is to confirm that your application is now fully approved. The protocol is approved through 9/11/2016.

You are granted permission to conduct your study as most recently described effective immediately. The study is subject to continuing review on or before 9/11/2016, unless closed before that date.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Tom Bailey (208-282-2179; fax 208-282-4723; email: humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

A handwritten signature in black ink, appearing to be 'RB', with a large, sweeping flourish underneath.

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

Dedication

Dedicated to my wife for all of the long nights she spent with our children while I was away at class, and for her love and patience.

Thank you.

Acknowledgements

I would like to acknowledge Dr. Alan Frantz for taking me under his wing in the middle of the dissertation process, my dissertation committee members Dr. Pat Terrell, Dr. Gloria Jean Thomas, Dr. Jonathan Lawson, and Dr. Jeremy Thomas for their constant encouragement, Dr. David Coffland for his assistance with statistical analysis, and all other faculty and staff at ISU and my study site who provided words of wisdom and advice.

Thank you.

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APPLICATION OF THE STAGES OF CHANGE IN EXPLORING FRESHMAN COLLEGE STUDENT PERCEPTIONS AND BEHAVIORS OF BINGE DRINKING

Dissertation Abstract—Idaho State University (2016)

The purpose of this study was to explore the application of the stages of change presented in the Transtheoretical Model of Change (TTM) in identifying differences in freshman binge drinking perceptions and behaviors and whether self-identified stage of change is a significant factor in identifying binge drinking students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States. Results indicated that for the sample ($n = 227$) there were significant differences between the stages of change in relation to the following perceptions and behaviors: 1) binge drinking is a normal part of college life; 2) students drink to get drunk; 3) academic performance and GPA; 4) student retention; 5) class attendance; 6) intent to join a fraternity or sorority; 7) it is easier to socializing and have fun at parties; 8) time spent seeking parties with alcohol; 9) riding in a car with a binge drinker; 10) experiencing blackouts/memory loss; 11) caring for a peer who has been binge drinking; 12) embarrassed themselves or done something they regretted when binge drinking; 13) binge drinking as a stress management technique; and 14) the perception that parents would be worried about students' binge drinking behavior. Regression models including stage of change identification had a greater chance of predicting binge drinking behavior than models without stage of change identification.

CHAPTER I

Introduction

Trends in higher education resurface over time; however, college drinking is one topic often associated with college life that seems to remain constant. It is the normative perception of college drinking that Dowdall (2009) addressed in the following passage: “College drinking is part of a pervasive and deep rooted college culture, one that shapes individual student behavior as well as the organizational responses that higher education has made to this behavior” (p. x). College drinking, therefore, is not a new problem. Student alcohol consumption affects students academically, socially, legally, and directly influences their safety and the communities in which they live (Commission on Substance Abuse at Colleges and Universities [CASA], 2007; Core Institute, 2005; Mallett, Bachrach, & Turrisi, 2008; Mundt, Zakletskaia, & Fleming, 2009; Powell, Williams, & Wechsler, 2002; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). Colleges and universities have implemented various intervention strategies to influence student alcohol consumption and greatly reduce the phenomenon of binge drinking; however, despite these efforts, there has been little change in the rates of consumption or binge drinking over the last two decades (Johnston, O’Malley, Bachman, & Schulenberg, 2010a, 2010b). Innovative research addressing college drinking, specifically binge drinking, may shed new light on this problem and pave the way for new intervention strategies.

College drinking is not a new problem to higher education. Lucas (1994), in *American Higher Education: A History*, periodically provided brief generalizations of students in different periods of higher education’s history. These generalizations often

described student conduct and behavior, with student use of alcohol noted as frequently associated with student life. For example, Lucas (1994) stated, “Furthermore, even as judged by the standards of the day, drinking, gambling, and sloth among the student body had reportedly attained epidemic proportions” (p. 97). According to Dowdall (2009), college drinking research began as early as the 1920’s and since the mid 1990’s has produced over 1,000 studies, many of which focus on binge drinking. Despite the large amount of research conducted on college drinking, researchers continue to push forward with new studies in an effort to understand college drinking and “identify strategies to reduce alcohol consumption and, in turn, the harms that result from heavy consumption” (Wechsler, & Nelson, 2008, p. 4).

In recent years the focus has shifted from college drinking to a more specific form of alcohol consumption called binge drinking. Binge drinking, as defined by The Harvard School of Public Health College Alcohol Study (CAS, 2001), includes “male students who have had five or more drinks in a row at least once in a two-week period and female students who have had four or more drinks in a row” (para. 1). While there is some debate over the exact definition of binge drinking, several organizations and studies have used definitions similar to the CAS study (Core Institute, 2005; National Institute of Alcohol and Alcoholism, 2004; Wechsler, Lee, Kuo et al., 2002; Wechsler & Nelson, 2008).

Binge drinking affects students’ academic performance and the ability to remain in school. According to ACT (2006a), the national university and college freshman to sophomore dropout rate ranges from 47.5% at two-year public institutions to 30.1% at public bachelor’s degree level institutions. The rate for comparable private institutions is

only slightly better (ACT, 2006b). These rates have varied little from 1983 to 2005 (ACT, 2006a). One factor shown to influence a large number of dropout students is alcohol consumption (Martinez, Sher, & Wood, 2008). However, the exact number of students dropping out of colleges and universities as a direct result of alcohol use, according to the Higher Education Center for Alcohol, Drug Abuse and Violence Prevention (n.d.), is unknown. Nevertheless, the Core Institute (2005) study found that among students aged 18-24 years, 45.1% had engaged in binge drinking within the past two weeks. Wechsler, Davenport, Dowdall, Moeykens, and Castillo (1994) studied 1792 college students from 144 four-year U.S. institutions and found that 44% of the students engaged in binge drinking and half of that group were considered frequent binge drinkers.

Studies have noted the negative consequences associated with binge drinking on student safety. According to the Core Institute (2005) survey, students who “reported being intoxicated at least weekly or more, on average...experienced 30-70 times the number of negative consequences” compared to their drinking and non-drinking peers (p. 19). As early as 1994, Wechsler et al. reported that “frequent binge drinkers were seven to 10 times more likely than the non-binge drinkers to not use protection when having sex, to engage in unplanned sexual activity, to get into trouble with campus police, to damage property, or to get hurt or injured” (p. 1676). The Commission on Substance Abuse at Colleges and Universities (CASA) (2007) study concluded:

Alcohol abuse, the most prevalent form of substance use on college campuses, is responsible for the most damaging consequences—including academic problems, risky sexual behavior, crime and other disturbances in the campus’ surrounding

community, illness, unintentional injuries, suicide and accidental deaths and increased risks of alcohol abuse and dependence. (p. 29)

In short, binge drinking increases students' exposure to negative physical, social, academic, and psychological consequences (CASA, 2007; Core Institute, 2005, 2010; Mallett et al., 2008; Mundt et al., 2009; Wechsler et al., 1994; Wechsler, Lee, Kuo et al., 2002; Wechsler & Nelson, 2008).

Colleges and universities have tried several approaches to influence binge drinking, and these efforts have met with varying results (CASA, 1994, 2007; Prochaska et al., 2004; Wechsler, Lee, Kuo et al., 2002; Weitzman & Nelson, 2004). According to CASA (1994), colleges and universities usually have one of the following three goals associated with campus alcohol policies: (1) "complete abstinence or elimination," (2) "responsible moderation," and (3) "reducing consequences" (p. 41). Policy alone, however, is not enough. More recent strategies noted in college-drinking research include social-ecological and other environmental/community approaches (DeJong & Langford, 2002; Saltz & DeJong, 2002; Saltz et al., 2009; Toomey & Wagenaar, 2007; Wood et al., 2009), peer influence (Cimini et al., 2009; Cranford et al., 2009), individual strategies (Larimer & Cronce, 2007), normative referencing/social norms (Larimer et al., 2009; Moore, Williams, & Murphy, 2013; Perkins, 2002; Scribner et al., 2011; Thombs et al., 2004), and even parent based initiatives (Ichiyama et al., 2009).

Research is needed to continue to improve alcohol prevention services on college campuses. Despite an increased awareness and the use of intervention strategies, CASA (2007) concluded that "most schools identify students only when they already have a full-blown problem," and "only 39.6% of schools report any screening of students for alcohol

problems through health services” (p. 10). Weitzman and Nelson (2004) stated, “Ultimately, we need to become more sophisticated in crafting and targeting prevention efforts so that the field moves away from the misconception that ‘one size fits all’ when designing prevention programs” (p. 262). And according to the CASA (2007) study, prevention programs should be “comprehensive” and include “environmental management” as a main focus (p. 8). The Transtheoretical Model of Change (TTM), as applied to alcohol prevention, may provide a useful framework for establishing a university-specific and comprehensive environmental program targeting binge drinking.

The TTM provides a framework for individual and environmental change. TTM is a “model of intentional behavior change” and “a way of understanding the process of behavior change that an individual experiences and participates in as he or she creates new behaviors, modifies existing behaviors, or stops problematic patterns of behavior” (DiClemente, 2005, p. 5). According to Prochaska and DiClemente (1983), individuals engaged in the change process progress through a series of steps called the *stages of change*. Each stage of change consists of a series of activities (*processes of change*) that must be completed before progression to the next stage of change (Prochaska & Velicer, 1997). TTM is used as a change model in various fields including smoking, alcohol and substance addictions, eating disorders, AIDS prevention, panic and anxiety disorders, obesity, cocaine use, dieting, exercise, and mammography screening, to name a few (DiClemente, Schlundt, & Gemmell, 2004; Prochaska et al., 1994; Prochaska & Velicer, 1997).

Although TTM has proven effective in promoting individual change, it has also been effectively applied to groups or systems of people. For example, Prochaska et al.

(2004) reported on TTM as an intervention model for alcohol abuse on a college campus. They described how using TTM to identify the stage of change associated with different university groups (faculty, staff, administration, students, etc.) allowed the application of stage-specific interventions to each group in an effort to promote change. Despite the success of TTM to facilitate individual and group change, criticism of the model exists. Sutton (2001) criticized proponents of TTM for not having congruent theoretical definitions, no single instrument for measurement, and lacking sufficient research on the major precepts of TTM.

In summary, college drinking is not a new problem. It continues to directly and indirectly influence student retention, academics, health, wellbeing, and safety. Despite efforts by colleges and universities to influence binge drinking, rates have changed very little over the last few decades. Broader application of theories, such as TTM, may provide a framework for new approaches in assessing binge drinking and identifying interventions; however, more research is needed. This study, therefore, focused on the use of TTM in identifying and understanding the behaviors and perceptions of binge drinking by college freshman. More important, this study sought to answer the question whether the self-identified stage of change is a significant factor in identifying binge drinking students.

Purpose Statement

The purpose of this study was to explore the application of the stages of change presented in the Transtheoretical Model of Change, a change model based on five stages of intentional change (precontemplation, contemplation, preparation, action, and maintenance) developed by Prochaska and DiClemente (1983), in identifying differences

in freshman binge drinking perceptions and behaviors and whether self-identified stage of change is a significant factor in identifying binge drinking students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States.

Research questions. The following questions guided this study:

1. What are the student demographics, in terms of numbers, gender, age-range, etc. that are self-identified in each stage of change category associated with the TTM, at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
2. What are the differences in alcohol consumption among students between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
3. What are the differences in student perceptions and behaviors of binge drinking experiences between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
4. What are the differences between self-identified stage of change and other factors in the literature associated with identifying binge drinking students?

Definitions

The following definitions are important in understanding this study:

Carnegie Classification. “The Carnegie Classification has been the leading framework for recognizing and describing institutional diversity in U.S. higher education for the past four decades.” (The Carnegie Classification of Institutions of Higher Education, n.d.). Utilizing the Carnegie Classification system allows for limited institutional comparison of other similarly Carnegie Classified institutions, and provides information for cautious generalization of this study’s findings to other settings.

Freshman. For the purpose of this study, a freshman student is a student who is enrolled full-time at the university identified in this study in his/her first semester (fall or spring) of college following high school graduation, and has never been enrolled as a full-time college student at another college or university.

Gender. For the purpose of this study gender is classified as Male and Female.

Intentional change. Intentional change is behavior change “that is intentional in contrast to imposed, manipulated, or mandated change where intention and cooperation are minimized” (DiClemente, 2005, p. 6).

Self-identified. For the purpose of this study, self-identified described participants responding to a short algorithmic questionnaire, and based on their answer being placed in one of the five stages of change or non-binge drinker group.

Northwestern United States. “The states usually included in the region are Idaho, Montana, Oregon, Washington, and Wyoming” (Lexic.us, 1998).

Stages of Change. Stage of change is a key concept in the Transtheoretical Model of Change that involves “critical tasks to be accomplished in order to initiate a

behavior and to consolidate that change into a stable pattern” (DiClemente, 2005, p. 6). The critical tasks that together form the Stages of Change include: precontemplation; contemplation, preparation, action, and maintenance (Prochaska et al., 1992).

Precontemplation. Precontemplation is the first stage of change identified in the Transtheoretical Model of Change. “People in this stage usually have no intention of changing their behavior, and typically deny having a problem” (Prochaska et al. 1994, p. 40).

Contemplation. Contemplation is the second stage of change identified in the Transtheoretical Model of Change is contemplation. According to Prochaska et al. (1994), people in this stage “acknowledge they have a problem and begin to think seriously about solving it” (p. 41-42).

Preparation. Preparation is the third stage of change identified in the Transtheoretical Model of Change. “Most people in the preparation stage are planning to take action within the very next month” (Prochaska et al., 1994, p. 43).

Action. Action is the fourth stage of change identified in the Transtheoretical Model of Change. The action stage is when “individuals modify their behavior, experiences, or environment in order to overcome their problems. Action involves the most overt behavioral changes and requires considerable commitment of time and energy” (Prochaska, DiClemente, & Norcross, 1992, p. 1104).

Maintenance. Maintenance is the fifth stage of change identified in the Transtheoretical Model of Change. “Maintenance is the stage in which people work to prevent relapse and consolidate the gains attained during action” (Prochaska et al., 1992, p. 1104).

Transtheoretical Model of Change. “The Transtheoretical Model of Intentional Behavior Change is a way to view human behavior change that is intentional in contrast to imposed, manipulated, or mandated change where intention and cooperation are minimized” (DiClemente, 2005, p. 5). The major constructs associated with TTM include: “(a) a cyclical pattern of movement through specific stages of change, (b) a common set of processes of change, and (c) a systematic integration of the stages of change and processes of change” (Prochaska et al., 1992, p. 1110).

Assumptions, Limitations, Delimitations

Assumptions. It was assumed that respondents were able to access, read, and understand electronic communication presented by the researcher in the form of emails and survey instrumentation. Efforts were taken by the researcher to make the survey instruments easy to understand and administer with the use of a professional survey service. It was also assumed that because of confidentiality and anonymous reporting, respondents will feel comfortable during the reporting process and will provide true and honest responses pertaining to personal demographic data and answers related to survey instrumentation. It was the assumption of the researcher that respondents would be interested and engaged in the research topic and would have personal interest in completing the surveys.

Limitations. It was understood that due to the sensitive nature of the inquiry topic (i.e., binge drinking), respondents may not have felt comfortable and chose to be less than entirely forthcoming in their responses, or chose to discontinue participation in this study. The researcher took precautions to ensure respondent confidentiality and thereby minimize potential respondent discomfort and any associated tendencies toward non-full

and/or inaccurate disclosure. Respondents were informed of the voluntary nature of this study, and that they may discontinue participation at any time without consequence. Participant discontinuation or initial refusal to participate in the study contributed to participant mortality.

Participant mortality may also affect generalizability. It is recognized that potential respondents declined to participate or withdraw from the study, therefore, affecting the diversity of the sample and the ability to generalize findings to other student populations. At the conclusion of this study, there were no reports of emotional or psychological discomfort reported by participants.

Limitations may have impacted the generalizability of this study. For example, the sample for this study will be solicited from one Carnegie Classification. Because of the unique social and cultural nature of each university campus, the ability to generalize results to other university campuses and their student bodies will need to be done with caution.

The timing of when this study was conducted may also impact findings associated with the study. The pilot study and research was conducted in the spring 2016 academic semester. This study may have reported different results if conducted earlier in the academic year. There may also be a question as to how many students were no longer attending the university in the spring 2016 semester due to binge drinking behavior and were, therefore, not available to participate in this research. However, it is unknown what results would have been affected by a change in timing. Replicating this study in a different semester or time period may need to be addressed in the future.

As with other studies, the instruments used to measure responses may have limitations. For example, there are criticisms of the staging algorithm used in this study to identify an individual's stage of change, as well as a researcher developed survey instrument. Each instrument may have its own set of limitations and ability to measure factors related to binge drinking.

Delimitations. This study was narrow and specific in its focus, with a sample solicited from one specific part of a specific university population (freshman students). This particular subset of the study body is of particular interest to the researcher's professional work history. Other classifications of the student body were not selected for this study by the researcher due to size, scope, and focus areas of the study. Future research may include upper classmen (sophomore, junior, senior, and graduate) students. Student demographics may be unique to this particular region of the country and to this university. Demographic information that may influence the generalizability of this study is discussed in Chapter III. Generalizability, therefore, is limited to the nature, size, and similar sample characteristics of this particular university. However, it is noted that each university campus has its own culture and student body dynamics that warrant caution in generalizing results to other settings.

The specificity of this study limits the interpretation and application of results to other areas of research. It is recognized that the time of year in which this study is conducted may influence results and interpretation of results to settings inside and outside the institution setting for this study. However, the timing of this study was influenced by Human Subjects Approval, availability of contact information, and the research site's academic calendar. It is also recognized that the survey instruments used in this study

focus primarily on one aspect of college drinking—binge drinking and will, therefore, limit the scope, interpretation, and generalizability of results. The instruments used to measure binge drinking relied solely on self-report measures, and other forms of drinking measurement (blood alcohol levels, specific time measurement, journaling, etc.) were not utilized in this study. Thus the application of the results to broader definitions and other measures of binge drinking should be interpreted with caution.

The survey instruments were selected and created to narrow the amount of information gathered in the study. The researcher conducted an extensive literature review to identify key measurement indicators associated with binge drinking. Some indicators, including a focus on athletics for example, were not strongly addressed in this study as in other studies. Therefore, not every indicator associated with binge drinking is addressed in the survey instruments. The researcher tried to identify those indicators that appeared to be most relevant to the general student body of a college or university. A researcher developed survey instrument was created from the identified indicators. The Transtheoretical Model of Change, the foundational theory represented in this study, was selected from other models due the researcher's professional interest in the theory and its use as a personal change model used in several health related fields.

Significance of Study

College student drinking, especially binge drinking, continues to be a concern for many college and university campuses across the nation. Research indicates that college student binge drinking rates have varied little over the past two decades. Over 1,000 research studies have been conducted since the 1920's focusing on individual, campus, and community challenges due to college student drinking. Binge drinking, the most

severe form of college student drinking, is linked to social, academic, personal, health, and safety risks for students. Understanding the factors related to college student binge drinking and identifying students engaged in binge drinking are critical roles in developing positive interventions for individual campuses. One model or framework that can be used in identifying binge drinking students is the Stages of Change found in the Transtheoretical Model of Change. Through the lens of the Stages of Change, researchers can identify factors associated with binge drinking and develop a model for identifying binge drinking students. Administrators, counselors, Greek life advisors, and housing directors can then use the model to identify binge drinking students and adjust intervention strategies for these students. The purpose of this study, therefore, was to explore the application of the stages of change presented in the Transtheoretical Model of Change, a change model based on five stages of intentional change (precontemplation, contemplation, preparation, action, and maintenance) developed by Prochaska and DiClemente (1983), in identifying differences in freshman binge drinking perceptions and behaviors and whether self-identified stage of change is a significant factor in identifying binge drinking students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States.

The significance of this study, therefore, is the opportunity to provide new insight into the application of TTM in exploring differences in freshman student binge drinking behaviors and perceptions, and evaluating whether self-reporting stage-of-change in regard to binge drinking is a significant factor in identifying binge drinking behavior. This study, therefore, contributes to the general knowledge base regarding college student drinking and provides a simple means for identifying factors related to binge drinking

unique to individual campus cultures by asking the questions: What perceptions and behaviors related to college student drinking identify binge drinking students, and is self-reported stage of change a significant identifying factor?

Summary

The purpose of this study was to explore the application of the stages of change presented in the Transtheoretical Model of Change, a change model based on five stages of intentional change (precontemplation, contemplation, preparation, action, and maintenance) developed by Prochaska and DiClemente (1983), in identifying differences in freshman binge drinking perceptions and behaviors and whether self-identified stage of change is a significant factor in identifying binge drinking students at a *Carnegie R2*: Doctoral Universities – Higher Research Activity located in the northwestern United States. Student drinking and binge drinking rates have changed little over the last couple of decades. New strategies and ways of assessing binge drinking are needed in order to develop more effective interventions. The use of TTM as a significant factor in identifying student binge drinking may further help researchers understand the binge drinking phenomenon, and aid college and university staff in identifying factors unique to their campus in order to evaluate the appropriateness and effectiveness of their chosen interventions. This research may also provide the stimulus for further research into TTM's ability to predict and correctly match intervention strategies that significantly affect student binge drinking.

CHAPTER II

Literature Review

The purpose of this study was to explore the application of the stages of change presented in the Transtheoretical Model of Change, a change model based on five stages of intentional change (precontemplation, contemplation, preparation, action, and maintenance) developed by Prochaska and DiClemente (1983). It identifies differences in freshman binge drinking perceptions and behaviors and whether self-identified stage of change is a significant factor in identifying binge drinking students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States.

Research questions. The following questions guided this study:

1. What are the student demographics, in terms of numbers, gender, age-range, etc. that are self-identified in each stage of change category associated with the TTM, at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
2. What are the differences in alcohol consumption among students between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
3. What are the differences in student perceptions of binge drinking experiences between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by

students at a *Carnegie R2*: Doctoral Universities – Higher Research Activity located in the northwestern United States?

4. What are the differences between self-identified stage of change and other factors in the literature associated with identifying binge drinking students?

The literature review includes two main sections: (a) Binge Drinking and (b) the Transtheoretical Model of Change. The first section, Binge Drinking, defined binge drinking and identified factors from the literature that have shown to have an association with college student binge drinking and the effects binge drinking has on students' health, safety, and academics, and intervention strategies that have been used by colleges and universities. Although fairly comprehensive, there are factors associated with binge drinking that were left out of this study because the association was too narrow and excluded a majority of the student body. For example, there is a strong association between binge drinking and participation in college athletics that was not included in this study. However, some factors were expanded from a specific narrow definition to a broader definition, allowing for greater personal perception of the effects of binge drinking. For example, specific definitions of sexual assault were not addressed in this study, but the perception of unwanted sexual advances was asked. In summary, the literature review guided the development of the PBHRD survey instrument in order to capture participant behaviors and perceptions of college student binge drinking.

Binge Drinking

Definition. In general, college student drinking has received the attention of academia, government and the media; however, a large amount of research and focus has been directed to understanding and defining binge drinking. According to CAS (2001),

binge drinkers are “male students who have had five or more drinks in a row at least once in a two-week period and female students who have had four or more drinks in a row” (para. 1). This definition is commonly referred to as the five/four measure of binge drinking, and variations of this measure have been used to define excessive or binge drinking in research (CAS, 2001; Dowdall & Wechsler, 2002; National Institute of Alcohol and Alcoholism, 2004; Wechsler, Lee, Kuo et al., 2002). Dowdall and Wechsler (2002) concluded the following:

There has been general agreement about the desirability of using this measure (usually constructed as drinking five or more drinks in a row or at a sitting), with national studies such as the Monitoring the Future series, the Harvard School of Public Health College Alcohol Study and the Core Institute series all using a similar definition. (p. 18)

Nevertheless, despite what appears to be general agreement on a working definition of binge drinking, other definitions exist.

There is some disagreement as to a universal definition of binge drinking and critics of the five/four measure offer alternative or hybrid definitions, while other researchers try to deconstruct binge drinking into degrees of binge drinking. For example, the National Institute of Alcohol and Alcoholism (NIAA, 2004) embraces a hybrid five/four definition by tying it to a medically measurable definition of binge drinking that includes “a pattern of drinking alcohol that brings blood alcohol concentration (BAC) to 0.08 grams percent or above” (p. 3). Wechsler, Lee, Kuo et al. (2002) and the CAS (2001) study, while maintaining the five/four measure, identified the difference between frequent binge drinkers (binging 3 or more times in a 2 week period) and occasional

binge drinkers (binging 1 or 2 times in a 2 week period). Responding to criticism of the five/four measure of binge drinking, Wechsler and Nelson (2001) wrote, “Monitoring the alcohol use behavior and experiences with alcohol-related harms of college students is an important public endeavor. The five/four measure of binge drinking is a key component of this effort” (p. 290).

Arguments in favor of the five/four measure of binge drinking seem to capture the scope and consequences of heavy drinking, and provide a means of study comparison. Wechsler and Nelson (2008) researched the ISI Web of Science database looking for research conducted on binge drinking and found that a majority of articles supported the five/four definition of binge drinking or were slightly lower or higher in their working definitions. Nevertheless, Wechsler and Nelson (2008) argued using the five/four measure may exclude the measurement of some students and the negative effects of alcohol at lower levels of consumption, but that “most alcohol-related harms experienced by college students occur among drinkers captured by the five/four measure of consumption” (p. 2). Wechsler and Nelson (2001) also argued that “a significant advantage of a five-drink measure is that is extensively used in population-based research, making results comparable across studies” (p. 287).

Binge drinking rates. In order to understand the effect binge drinking has on college students, it is important to first understand the rates at which college students engage in binge drinking activities. In 1993 the Harvard School of Public Health conducted the College Alcohol Study (CAS). The CAS, a national survey of over 14,000 students from 120 four-year institutions, has generated more than 80 peer-reviewed articles addressing college students and the effects of alcohol. CAS follow-up studies

have been conducted in 1997, 1999, and 2001. Wechsler, Lee, and Kuo et al. (2002) compared data across all four CAS surveys, and found that between 1993 and 2001 there was no significant change in binge drinking rates among college students (44.4%). Furthermore, Wechsler, Lee, and Kuo et al. (2002) noticed that over time the CAS data showed an increase in the number of students abstaining from alcohol use, but also an increase in the number of students reporting frequent binge drinking. These changes can be explained due to awareness and prevention efforts of colleges and universities to affect alcohol use on their campuses, but the increase in binge drinking behavior may still be heavily influenced by the prevailing culture of alcohol use by college students.

In 1993, the Commission on Substance Abuse at Colleges and Universities (CASA) conducted the first of two national surveys targeting substance abuse and college students. In 2002, CASA conducted a follow-up analysis to determine what changes, if any, had occurred in the alcohol and substance abuse rates of college students. Results of the CASA efforts are found in the CASA (2007) report entitled *Wasting the Best and the Brightest: Substance Abuse at America's Colleges and Universities*. Final analysis of more than 2,000 student phone surveys from approximately 400 colleges and universities, and in-depth analysis of more than six national databases confirmed the following:

From 1993 to 2005, there has been no significant reduction in the levels of drinking and binge drinking among college students. In 2005, 67.9% of students (approximately 5.4 million students) reported drinking in the past month and 40.1 percent (approximately 3.1 million students) reported binge drinking. However, from 1993 to 2001 rates of riskier drinking—frequent binge drinking, being intoxicated, drinking to get drunk—have increased. (p. 3)

Another study of 10,424 college freshman at 14 schools across America found similar rates of binge drinking—41% (males) and 34% (females) drank at or above the binge drinking threshold (White, Kraus, & Swartzwelder, 2006).

A third major national study conducted by the CORE Institute found binge drinking rates similar to those of the CAS (2001) and CASA (2007) studies. The CORE Institute researchers, located at the Southern Illinois University at Carbondale Student Health Center, surveyed students' perceptions, attitudes, and opinions about alcohol and drugs. The CORE (2010) report analyzed data gathered from 2006-2008 and found that using the five/four measure, 45.9% of students reported binge drinking in the two weeks prior to the survey. Other researchers have found rates of binge drinking similar to those of the CAS (2001), CASA (2007), and CORE (2010) studies (Johnston et al., 2010a; Johnston et al., 2010b; Mundt et al., 2009; O'Malley & Johnston, 2002; White & Swartzwelder, 2009).

While the rates of binge drinking may vary at individual colleges and universities (Wechsler et al., 1994), results gathered from the CAS (2001), CASA (2007) and CORE (2010) surveys suggest that the national rates of binge drinking in the United States among college students is roughly 40.0% at any given time. Figure 1. compares the rates of binge drinking from these three major studies.

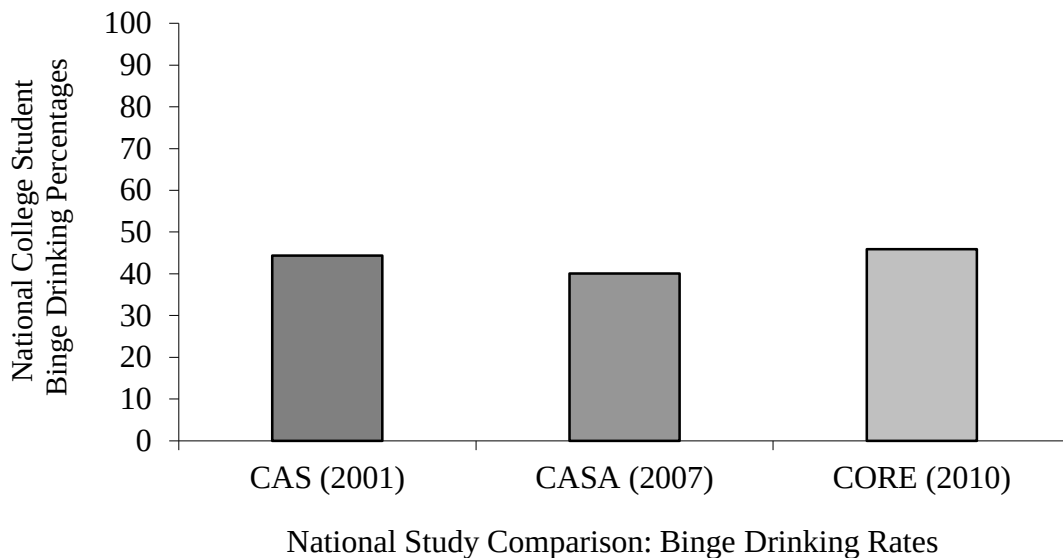


Figure 1. Percentage of binge drinking college students reported by three national studies.

Similar to the information in Figure 1, O’Malley and Johnston (2002) analyzed results from the following five studies to see if they could form an estimation of student alcohol use:

1. Harvard School of Public Health College Alcohol Study (CAS)
2. Core Institute (CORE)
3. Monitoring the Future (MTF)
4. National College Health Risk Behavior Survey (NCHRBS)
5. National Household Survey on Drug Abuse (NHSDA)

O’Malley and Johnston (2002) found that “approximately two of five American college students were heavy drinkers” when using the 5/4 measure of binge drinking (abstract).

Binge drinking demographics. College student binge drinking rates differ by demographic characteristics. Another national survey concerned with the alcohol and

drug use among America's young adults is Monitoring the Future (MTF). Housed in the Survey Research Center in the Institute for Social Research at the University of Michigan, the MTF survey is "an ongoing study of the behaviors, attitudes and values of American secondary school students, college students and young adults. Analyzing data from the MTF, Johnston et al. (2010a) concluded: "In 2009, for example, nearly half (45.0%) of all college males reported having five or more drinks in a row over the previous two weeks versus less than one third (31.0%) of college females" (p. 28).

The idea that male college students binge drink more than female college students is supported by other studies as well. For example, White et al. (2006) gathered self-reported drinking histories for 10,424 first-semester freshman at 14 schools across America. The gathered histories consisted of a 2-week time period and specifically measured students who met the five/four marker for binge drinking and those students who consumed alcohol at two-times or more the five/four threshold. White et al. found that one in five males and one in ten females consumed alcohol at twice the five/four binge drinking mark at least once in a two week period, and that frequent binge drinkers (drinking at or above the five/four threshold more than three times in a two week period) were more likely to double or even triple their levels of alcohol consumption beyond the five/four measure. The findings by Johnston et al. (2010a) and White et al. (2006) pertaining to gender differences in binge drinking rates seem to be consistent with other findings in the literature (CASA, 2007; Center for Disease Control and Prevention, 1997; CORE, 2010; CORE, 2005; Hingson et al., 2005; Johnston et al., 2010b; O'Malley & Johnston, 2002; Wechsler, Lee, Kuo et al., 2002). However, the CASA (2007) report noted that between 1993 and 2001, the rate of binge drinking for college women

increased faster (22.2 % increase) compared to male college students (12.5% increase). Johnston et al. (2010a) expressed that since the MTF study began, the gap in the rates between male and female college student binge drinking has “narrowed gradually, with the rate declining somewhat for males and increasing somewhat for females” (p. 28). The binge drinking rate changes may be directly related to the increase in the number of female students and decline in the number of male students at colleges and universities.

There are significant differences by race among college students who binge drink. In 1995, The Center for Disease Control and Prevention (CDC) (1997) conducted the National College Health Risk Behavior Survey (NCHRBBS). The purpose of the NCHRBBS was to identify the health risks of college students in six areas covering injuries, substance use, sexual health, physical health, and dietary health. The CDC NCHRBBS reported significant differences in alcohol use among college students based on race (White 92.6%, Black 82.7%, and Hispanic 87.5%). Further, the CDC concluded students who were more likely to binge drink were White, male, and between 18-24 years of age. O’Malley and Johnston (2002) conveyed similar findings that White college students comprised the highest number of heavy drinkers followed by Hispanic and Black college students. Wechsler, Lee, Kuo, et al. (2002) reported that between 1993 and 2001 binge drinking rates remained relatively stable among college student subgroups; however, Hispanic and Native American students showed a significant decrease. In short, the literature seems to support the notion that White, male students consistently rate the highest in their binge drinking activity (CASA, 2007; Center for Disease Control and Prevention, 1997; CORE, 2010; Hingson et al., 2005; O’Malley & Johnston, 2002; Wechsler, Lee, Kuo et al., 2002).

Racial and gender diversity on a college campus affects binge drinking rates. In an effort to further understand the influence race and gender have on campus binge drinking rates, Wechsler and Kuo (2003) gathered data from the 1993, 1997, 1999, and 2001 CAS surveys. Data from these CAS surveys were analyzed in order to account for the influence of demographic features on college student drinking rates. Wechsler and Kuo (2003) concluded that “the higher the percentage of minority, female, and older (aged ≥ 22 years) students in a school, the lower the binge drinking rates for total students and high-risk subgroups” (p. 1930). Similarly, Wechsler et al. (1994) reported that Black institutions and women’s colleges typically had lower rates of student binge drinking. The racial and gender makeup of a college campus, therefore, seems to have a mediating effect on binge drinking rates.

Academics and student retention. Research is mixed regarding the effects of binge drinking on academic performance and student attrition. Wechsler and Nelson (2008), interpreting CAS findings, concluded “that alcohol consumption at binge levels and beyond has a significant impact on college students’ academic performance” (p. 3). Maney (1990) surveyed 228 male and 195 female undergraduate students looking at the relationship between alcohol consumption and student characteristics, and found that alcohol intake was inversely related to GPA. Another study surveyed 161 undergraduate students, studying the relationship between personality traits, GPA, and substance use. In this study, Musgrave-Marquart (1997) found “significant negative correlations...between GPA and use of alcohol and nicotine” (abstract).

Williams, Powell, and Wechsler (2003) compared alcohol intake with hours spent studying and GPA. They determined that an increase in the number of drinks consumed

in one sitting directly impacted the amount of time studying (1 drink = 15 minutes less studying). Concerning GPA, Williams et al. (2003) concluded:

Using...the combined direct and indirect effect of drinking on GPA, we find that a unit increase in the number of drinks usually consumed reduces a student's GPA by 0.07. According to our estimates, about 5 additional drinks per drinking occasion would reduce a student's GPA from a *B* to a *B-*. (p. 19)

However, Powell et al. (2002), drawing from the 1997 and 1999 CAS studies, concluded: "The average number of drinks consumed per drinking occasion does not significantly affect getting behind in school and only weakly affects the probability of skipping class" (p. 14). In contrast, the CASA (2007) study reported that over half of binge drinking students reported either missing classes (68.1%) or falling behind in their school work (50.6%). Further research is needed to determine the effects binge drinking has on class attendance.

DeBerard, Speilmans, and Julka (2004) studied the effects of smoking and binge drinking on academic achievement and student retention. After surveying 204 undergraduate students, results indicated that binge drinking was not a significant predictor of academic achievement. DeBerard et al. (2004) wrote that "these findings are surprising, as drinking has been shown as related to achievement in other research" (para. 31). Research, therefore, seeking to find correlations between binge drinking and low academic performance has found mixed results.

Similar to the mixed results of binge drinking on academic performance, the research on binge drinking and student retention has also found mixed results. DeBerard et al. (2004) also assessed quality of life factors, smoking and binge drinking, and their

effects on GPA and student attrition. Results indicated that the model created by DeBerard et al. (2004) was not significant, and did not predict student retention. In a larger four-year longitudinal study Martinez et al. (2008) compared the event-history of 3,290 undergraduate students in order to determine the relationship between heavy drinking and attrition. Martinez et al. (2008) found a 28% attrition rate and concluded, “Not only did we demonstrate that heavy drinking does, in fact, relate to attrition, but we also demonstrated that different types of event attendance are related to heavy drinking and to attrition in different ways” (p. 6). Wechsler and Nelson (2008) reported that “The CAS findings have shown that alcohol consumptions at binge drinking levels and beyond have [sic] a significant impact on college students’ academic performance, social relationships, risk taking behaviors, and health” (p. 3).

Social aspects. Binge drinking on college campuses has social implications as well. Dowdall (2009) wrote that “during the last several decades, college student drinking went from being higher education’s dirty little secret to being an openly acknowledged social problem” (p. 1). A major arena for social interaction and student drinking on many colleges is centered on Greek life. According to CASA (2007), binge drinking rates are higher for students associated with fraternities and sororities. Similarly, Wechsler and Nelson (2008) reported that “membership in a fraternity or sorority” was associated with freshman undergraduate student binge drinking, and that “students living off campus away from their parents and students living in fraternity or sorority houses had the highest rates of binge drinking” (pp. 4-5). McCabe et al. (2005) followed 10 cohorts of high school students ($N=5883$) as they entered college; 17% were part of a fraternity or sorority. The study tried to determine what effect membership in a fraternity or sorority

had on college student substance use. McCabe et al. (2005) concluded that full participation in fraternities and sororities was associated with higher levels of heavy episodic drinking.

Student safety and negative consequences. Binge drinking directly affects the safety of college students. Notwithstanding the disagreements on an exact definition, measure, or rates of binge drinking, it is commonly accepted that the effects of binge drinking are significant. According to Courtney and Polich (2009):

Epidemiological reports of binge drinking vary in definitional consistency, but for young adults they indicate a large prevalence and imply a clear burden of suffering. The individual and social costs associated with binge drinking—such as drunken driving, induced violence, and personal injury—are profound. (p. 152)

Wechsler et al. (1994) studied the perceived number of negative experiences of binge drinking students and, in the analysis, determined that “frequent binge drinkers were 25 times more likely than non-binge drinkers to experience five or more” negative effects (p. 1675). The negative effects studied by Wechsler et al. included the following:

1. Have a hangover.
2. Do something you regret.
3. Miss a class.
4. Forget where you were or what you did.
5. Get behind in school work.
6. Argue with friends.
7. Engage in unplanned sexual activity.
8. Get hurt or injured.

9. Damage property.
10. Not use protection when having sex.
11. Get into trouble with campus or local police.
12. Required medical treatment of alcohol overdose.
13. Have five or more alcohol-related problems since the beginning of the school year. (p. 1675)

In 2002, Wechsler, Lee, Kuo et al. again studied the negative consequences experienced by students who consumed alcohol in the past 30 days. Not specifically accounting for binge drinking, they concluded that “one in 5 drinkers reported experiencing 5 or more problems related to their alcohol use, a rate that was consistent with previous results” (p. 210).

Other studies have found similar results concluding that students who binge drink seem to experience a greater frequency of negative consequences. For example, the CORE (2005) study concluded that students engaging in high risk drinking, on average, experienced a higher number of negative consequences compared to other students in the previous 12 months (23.7 negative consequences compared to 4.9 negative consequences). CORE (2005) also found that the more a student drank to be intoxicated, the more likely students reported negative consequences; and, if students reported weekly intoxication they “on average experienced 30-70 times the number of negative consequences” (p. 19). CASA (2007) concluded the following:

The most common secondary effects of college student drinking are property damage, and vandalism, fights, rape and other sexual violence and disruption to other students’ quality of life. Financial costs include damage to campus property,

increase in security staff and counselors, lost tuition from dropouts and legal costs of suits against the college for liability. (p. 5)

Mundt et al. (2009) conducted face-to-face interviews with 12,900 students from five different colleges seeking to understand the relationship between drinking and injury rates among college students. Similar to previous research, researchers found that male students, on average, consumed more drinks in a 28 day period than female students (60 compared to 36). Further analysis concluded that “male college students who consume 8 or more drinks per day have a 19% greater chance to suffer an alcohol-related injury with each additional day of extreme drinking” (p. 6).

Binge drinking is associated with a lack of personal safety for many college students. According to Wechsler et al. (1994), a major consequence of binge drinking is engaging in unprotected or unplanned sex. CASA’s (1999) report on substance abuse and sex explained that 46 to 75 percent of date rapes and sexual assaults experienced by college students involved alcohol; according to Johnston et al. (2001), this amounted to approximately 97,000 students. Krebs et al. (2007) in the Campus Sexual Assault (CSA) reported that 19% of undergraduate women had experienced attempted or completed sexual assault. CASA (2007) reported that some of the more damaging effects of binge drinking to a student’s personal safety include unplanned or unwanted sexual activity, illness and suicide. Mundt and Zakletskaia (2012) followed 954 high-risk students from five universities to determine the costs of emergency room visits associated with black outs caused by alcohol consumption. Over half of the students sampled experienced one or more black-outs in twelve months, and students reporting three to five blackouts during the study (15% of sample) accounted for the highest number of emergency room

visits (21%). Of the 404 identified emergency room visits, 52.7 visits (12.8%) were related to blackout drinking. In conclusion, Mundt and Zakletskaia (2012) calculated that “at a university of 40,000 students, with 25 percent of students experiencing blackouts, yearly emergency department costs due to blackouts would range from \$469,000 using national data...” (para. 46).

The relationship between student binge drinking and driving while intoxicated is a safety concern commonly found in the literature. Wechsler et al. (1994) noted a positive relationship between binge drinking and driving under the influence. Hingson et al. (2005) reported that as the number of students binge drinking increased, so did the number of students driving under the influence of alcohol. CASA (2007), using 1998 data as a backdrop, concluded that 1,248 students died in alcohol-related car crashes. According to the NCHRBBS (Center for Disease Control and Prevention, 1997), 27.4% of the students surveyed reported drinking and driving. Courtney and Polich (2009) concluded that “the individual and social costs associated with binge drinking—such as drunken driving, induced violence, and personal injury—are profound” (p. 152).

Despite the negative consequences associated with binge drinking, college students continue to binge drink with little change in national binge drinking rates. One explanation for the steady numbers of binge drinking students can be derived from Weitzman and Nelson (2004), who stated “individual motivation to stop drinking is low among college students” (pp. 248-250). The 1994 CASA report suggested that students drink to “have fun,” which is usually associated with attempts at “alleviating boredom, stress, anxiety and pressure created by academic demands; reducing social sexual inhibitions; and simply blowing off steam” (p. 28).

Binge drinking affects student who do not binge drink. Wechsler et al. (1994), while reporting the negative effects experienced by binge drinking students, also reported on the negative effects experienced by their peers. Wechsler et al. concluded that non-binge drinking students attending schools with a high proportion of binge drinking students were more likely to experience negative effects associated with binge drinking, including some of the following: embarrassment, arguments, insults, physical or sexual altercations, damaged belongings, having to care for a drunken peer, or an interruption of sleep or studying. Hingson et al. (2005) reported that “annually over 600,000 college students nationwide were hit or assaulted by a drinking student” (p. 269). The effects of binge drinking, therefore, not only influence the binge drinking student, but they impinge on other students as well.

Recent studies have tried to link binge drinking to changes in personality traits and mental health as a way of further understanding the personal risk associated with binge drinking. Mallett, Bachrach, and Turrissi (2008) surveyed 341 freshman students at a large public university in the northeastern United States in an effort to assess students’ positive and negative perceptions of the consequences of alcohol use. The researchers found that those students who engaged in binge or heavier drinking often “perceived some specific consequences less negative and more positive” than their peers, including the effects of being drunk, blackouts, and unplanned sexual behavior (p. 5). White, Jamieson-Drake, and Swartzwelder (2002) found that approximately half of students reporting experiencing a blackout also later reported finding out they had engaged in at least one of the negative consequences associated with binge drinking, including unplanned or unwanted sexual behavior.

Quinn, Stappenbeck, and Fromme (2011), in an effort to further understand the relationship between binge drinking and personality traits, surveyed 1,434 students to determine if alcohol use was a predictor in personality trait changes in college students. These researchers concluded:

We found evidence for transactional relations between heavy drinking and change in sensation seeking and impulsivity. Both traits were significantly correlated with heavy drinking prior to college matriculation and predicted increases in heavy drinking across the first two years of college. Most important, however, there were individual differences in personality change, and heavy drinking was a significant predictor of that change. (p. 9)

Heavy or binge drinking, therefore, plays a role in personality change. In another study, Courtney and Polich (2009) analyzed available research to formulate a research based definition of binge drinking attributes, and concluded that “the cognitive damage that may be inflicted by binge drinking appears to involve alteration in critical neural mechanisms” (p. 152). According to these two studies, personality and cognitive functioning are both affected by binge drinking.

Another study focused primarily on the relationship between alcohol consumption and students’ mental health was conducted by Weitzman (2004) involving a national survey of 27,409 randomly selected college students. Students were asked to report levels of alcohol consumption, including binge drinking, and complete an instrument measuring poor mental health and depression (PMHD). Weitzman (2004) reported the prevalence of students falling into the category of PMHD was 4.8%. Even though students from all demographic categories appeared in the PMHD group, the average student most likely

suffering from PMHD was a non-white, female student who engaged in binge drinking activities with the intent of getting drunk.

Interventions. Colleges and universities have tried several approaches to influence binge drinking, and these efforts have met with varying results (CASA, 1994, 2007; Prochaska et al., 2004; Wechsler, Lee, Kuo et al., 2002; Weitzman, & Nelson, 2004). For example, there has been a prevention focus on social-ecological and other environmental approaches. These approaches try to address binge drinking at the campus level, in the local community, and as a result influence state regulations. The rationale is a multi-level approach to addressing college student drinking. Saltz and DeJong (2002) concluded, “There is little evidence that standard awareness and values clarification programs alone can reduce alcohol consumptions by college students” (p. 10). Based on the Higher Education Center’s environmental management framework, DeJong and Langford (2002) describe a social-ecological model of prevention “with programs and policies classified into five levels: individual, group, institution, community and state and federal policy” (p. 143). However, DeJong and Langford (2002) also note that “because well-structured evaluations of peer education are rare, such programs remain an unproven strategy for reducing student alcohol consumptions” (p. 142). Longitudinal research is needed to determine the long-term effectiveness of social-ecological approaches.

Similar to social-ecological approaches are strategies that focus mainly on environmental management. According to Tomey and Wagenaar (2007), environmental strategies have three main goals:

1. Reducing alcohol use and related problems among underage college students
2. Reducing alcohol use and related problems among all college students

3. De-emphasizing the role of alcohol and creating positive expectations on campus. (p. 208)

Tomey and Wagenaar (2007) concluded their research by acknowledging that previous research found a multi-pronged environmental approach effective; however, they also warned that at the time of their publishing many studies were not able to randomly assign sites to specific treatment conditions, making it difficult to conclude if the strategies employed significantly affect change.

Wood et al. (2009) studied the effects of a school/community initiative to environmentally influence college drinking. Data were gathered through telephone interviews over a period of four years at the University of Rhode Island. Although researchers concluded that their environmental management strategies “significantly increased students’ awareness of formal alcohol-control efforts, perceived likelihood of enforcement, and perceptions of responsible beverage service while decreasing perceptions of student misbehavior at off-campus parties” (p. 103), they also concluded that because individual schools have different campus/community environments and unique cultures, it is difficult to generalize findings from one campus to another campus. Another environmental study by Saltz et al. (2009) concluded that campus/community interventions significantly affected heavy drinking at two schools, but that further replication of the study was needed due to low statistical power.

While many studies have focused on developing environmental or multi-prong approaches to college student drinking, there are some intervention strategies that focus on the individual. In a review of the literature concerning individual focused drinking strategies, Larimer and Cronce (2007) made several conclusions. First, information only

campaigns and values clarification strategies did not affect drinking behavior. Second, self-monitoring and self-assessment interventions had no long term effect on drinking behavior. The authors, however, did find that normative re-education programs, brief motivational interventions, and multi-component skills training programs are promising individual interventions.

Cimini et al. (2009) studied the effectiveness of peer facilitated interventions. Researchers evaluated the effectiveness of motivational interviewing, peer theater, and an interactive alcohol education program on 685 judicially mandated college students from a large public university in the northeastern United States. Of the mandated students, 470 students responded to the researcher's request for follow up data. Cimini et al. (2009) concluded that "across all participants there were no overall changes in drinking outcomes from baseline to follow-up" (p. 62). In other words, there was no difference between treatments. However, one significant result from the study determined that "change in perceived drinking by the closest friend had a stronger relationship with changes in use/problems than the change in perceived drinking by the typical student" (p. 62). This result might suggest that peer influence, normative referencing, and social norms interventions may prove promising in affecting high risk drinking.

According to Saltz & DeJong (2002), social norms interventions involve "communicating actual student norms to dispel myths" or incorrect perceptions of social norms (p. 12). In other words, this approach assumes that personal and collective perceptions of the social norms regarding binge drinking or other social problems are incorrect. In an extensive literature review of social norms studies, Perkins (2002) stated "there is significant potential for engaging norms to serve in prevention efforts to reduce

problem drinking among students” (p. 170). Moore et al. (2013) studied 50 residence halls from four different universities in Wales. Residence halls were randomly assigned to intervention or control. Online and paper surveys measured student responses to messages, posters, and information regarding social norms in relation to student drinking. Moore et al. (2013) concluded that greater analysis and evaluation are needed as their study did not find social norms campaigning as having a significant effect on student drinking. Moore and his associates (2013) also concluded that significant changes in their research design might produce a greater sample. In other words, this study’s findings were inconclusive. Thombs et al. (2004) attempted to study why a social norms campaign failed to lower drinking rates at a large public university and cited the following three conclusions: 1) students did not believe the statistics and normative information used in the campaign; 2) a large number of students did not understand the purpose of the study or campaign materials; and 3) students relied on personal experience and not statistics to make their own judgments about the amount of drinking or “partying” on campus. The researchers also concluded that the design of social norms campaigns must continue to be developed.

Alcohol availability and perceived access to alcohol may also be a factor affecting social norms campaigns. Scribner et al. (2011) used data from the 2004 Social Norms Marketing Research project that surveyed students from 32 universities. Scribner and his associates (2011) categorized these universities according to alcohol outlet density (availability of alcohol near campus) and analyzed the affect outlet density had on social norms interventions. Researchers found that social norms campaigns targeting student alcohol use appear to be less effective on campuses with a high density of alcohol outlets.

Larimer et al. (2009) attempted to identify whether social norms campaigns targeting a student's normative reference group (ethnicity, gender, etc.) would significantly affect a student's drinking behavior. Drawing their sample for a large university in the northwest United States (N = 3008), students were asked to participate in a series of web-based surveys. Results indicated that social norms referencing specific demographics, perceived student drinking norms, ethnicity, and residence together predicted student alcohol consumption. Larimer et al. (2009) concluded that "providing normative feedback targeting at least one level—and potentially multiple levels—of specificity to the participant may be an important tool in normative feedback interventions" (p. 120).

Colleges and universities have also tried to enlist the support of parents in their efforts to influence student drinking. Ichiyama et al. (2009) enlisted 724 parents of freshmen and their students and assigned them randomly into either a control or intervention group. Researchers sent the intervention group of parents materials to read, share, and conduct follow-up activities with their student(s) in the summer months before enrolling at school. Follow up surveys concluded that students from the intervention group had a reduced risk for adopting drinking once they entered college and/or a slowed progression of drinking behaviors through the first year of college (mostly female students). Ichiyama et al. (2009) concluded that although further research is needed, parent involvement can have an effect on student drinking. Likewise, it appears that although colleges and universities continue to engage many strategies to reduce or affect student drinking, these strategies have produced mixed results and there is a continual need for further research.

Summary. As alcohol research has narrowed its focus on the phenomenon of student binge drinking, the definition of binge drinking is becoming more refined and the research continues to confirm national rates of binge drinking. Currently, the majority of studies use a variation of the five/four measure of binge drinking. National studies continue to confirm that college student binge drinking rates range from 40-45 percent. Male students binge drink at rates higher than female students; however, the rate of binge drinking for female students appears to be increasing at rates faster than for male students. Student binge drinking rates also vary by race, with White students binge drinking at the highest levels, followed by Hispanic and Black students. Colleges and universities with a higher number of female students, greater racial diversity, and an older student population tend to have lower binge drinking rates.

Research has tried to connect binge drinking to academic performance, student attrition, social affiliation, student safety, and personality change of college students. Studies have found mixed results regarding the negative effects of binge drinking on GPA or academic performance or student attrition. Students affiliated with fraternities and sororities binge drink more often compared to other students. Students who binge drink generally experience more negative consequences associated with alcohol use than other students. Research has paid particular attention to the negative consequences, including unwanted or unplanned sexual activity, drinking and driving, and personal injury. Recent studies, trying to understand the personal effects of binge drinking, have focused on personality changes and the increase in impulsive behavior experienced by students who binge drink. Intervention strategies have targeted individual students,

specific groups of students, campus and local policies, social norms campaigns, as well as community and parent involvement.

Binge drinking is a complex subject and further research is needed to understand the various aspects of student binge drinking. Hingson et al. (2005) concluded that “the magnitude of problems posed by excessive drinking among college students should stimulate both improved measurement of these problems and efforts to reduce them” (p. 268). Wechsler and Nelson (2008) stated:

Understanding the patterns of drinking by different groups of students and in different settings can help researchers understand the factors that promote heavy drinking and identify potential strategies to reduce alcohol consumption and, in turn, the harms that result from heavy consumption. (p. 4)

Likewise, the CASA (1994) Commission warned, “if we choose to ignore or relegate excessive college student drinking, as many are wont to do, to a ‘rite of passage,’ schools will nurture a behavior that is destroying lives and potentially endangering our country’s future” (p. 10). This research, therefore, will attempt to add to the body of knowledge concerning binge drinking and college students. The Transtheoretical Model (TTM) of change is a theory that offers a unique perspective in the study of student binge drinking.

Transtheoretical Model of Change

Theory. This section will focus on TTM as the main theory supporting this study. Particular attention will be made to the major concepts of TTM, areas of TTM research, staging algorithms, and the applicability of TTM to this study.

TTM grew out of a desire to understand individual change processes as described by the various theories of the day. In other words, a true transtheoretical model would

reveal the principles of change common to many different theories, and incorporate them into one comprehensive theory of change. This process would not “resolve all of the conceptual issues and conflicts among the various theories” (DiClemente, 2005, p. 5), but provide a foundation of the elements of change. Prochaska et al. (1994) explained, “We hope that an integrative approach can take us beyond the parochial pairing of partisan theories and therapies toward a more comprehensive approach to behavior change” (p. 45).

Although the ideas and development of a transtheoretical model had been proposed in early literature (Prochaska et al., 1994), it was not until Prochaska and DiClemente (1983) published a report identifying stages of change and processes of change used by 872 participants to quit smoking that a research-based model began to emerge. From this report Prochaska and DiClemente (1983) provided evidence of specific stages of change and change processes common to participants engaged in an intentional smoking cessation program. Prochaska and Velicer (1997) concluded the following:

One of our earliest empirical integrations was the discovery of systematic relationships between the stage people were in and the processes they are applying. This discovery allowed us to integrate the processes from theories that were typically seen as incompatible and in conflict. (p. 43)

TTM, therefore, has emerged as a “model of intentional behavioral change” and “a way of understanding the process of behavior change that an individual experiences and participates in as he or she creates new behaviors, modifies existing behaviors, or stops

problematic patterns of behavior” (DiClemente, 2005, p. 5). Prochaska and Velicer (1997) outlined the following foundational assumptions of TTM:

1. No single theory can account for all of the complexities of behavior change. Therefore a more comprehensive model will most likely emerge from an integration across major theories.
2. Behavior change is a process that unfolds over time through a sequence of stages.
3. Stages are both stable and open to change, just as chronic behavioral risk factors are both stable and open to change.
4. Without planned interventions, populations will remain stuck in the early stages. There is no inherent motivation to progress through the stages of intentional change as there seems to be in stages of physical and psychological development.
5. The majority of at-risk populations is [*sic*] not prepared for actions and will not be served by traditional action oriented prevention programs. Health promotion can have much greater impacts if it shifts from an action paradigm to a stage paradigm.
6. Specific processes and principles of change need to be applied at specific stages if progress through the stages is to occur. In the stage paradigm, intervention programs are matched to each individual’s stage of change.
7. Chronic behavior patterns are usually under some combination of biological, social, and self-control. Stage matched interventions have been primarily designed to enhance self-controls. (p. 41)

Along with these foundational assumptions, key to understanding TTM is knowledge of the stages and processes of change; major constructs of TTM.

Stages of Change. One of the major constructs associated with TTM is the stages of change. The stages of change represent tasks that must be completed before moving on to the next stage or phase of change. The tasks support each other, and as one stage is completed the groundwork is laid for the next stage to begin. The tasks associated with each stage of change are called the processes of change. According to Prochaska et al. (1992), the processes of change are actions and experiences of each individual, and “each process is a broad category encompassing multiple techniques, methods, and interventions traditionally associated with disparate theoretical orientations” (p. 1107). DiClemente (2005) explained stage progression in the following way:

Individuals can move forward, backward, and recycle through the stages. Some people become stuck in certain stages like precontemplation and contemplation for long periods of time. Others consider change and then reject it and return to precontemplation. Still others make a decision and a plan and fail to implement it. So according to the model the only way to be successful in making change is to do all of the tasks well enough to successfully create a new pattern of behavior.

(pp. 6-7)

The five stages of change associated with the TTM model most recognized today include precontemplation, contemplation, preparation, action and maintenance (Sutton, 2001).

Figure 2 provides a visual representation of the stages of change.

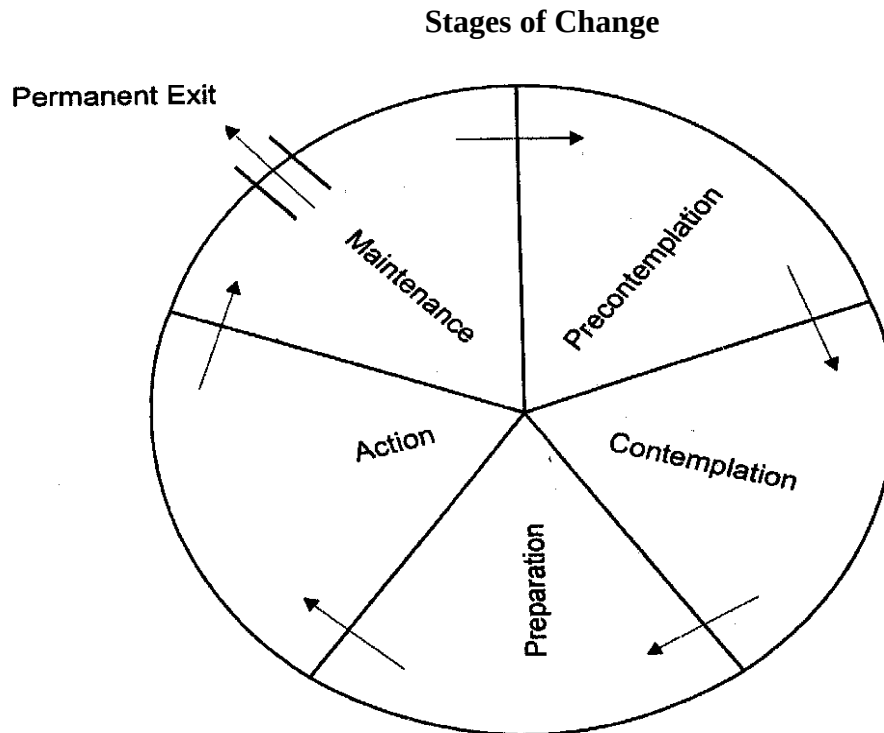


Figure 2. Flow chart representing the stages of change as described in TTM. Adapted from “*Enhancing Motivation for Change in Substance Abuse Treatment*,” by Center for Substance Abuse Treatment, 1999, Treatment Improvement Protocol (TIP) Series, Number 35, p. 17.

Precontemplation is the first stage of change in TTM. According to Prochaska et al. (1994), individuals identified in the precontemplation stage “usually have no intention of changing their behavior, and typically deny having a problem” (p. 40). In a smoking cessation study conducted by Prochaska and DiClemente (1983), participants in the precontemplation stage “process less information about smoking, spend less time reevaluating themselves as smokers, experience few emotional reactions to the negative aspects of smoking, and do little to shift their attention to their environment away from smoking” (p. 303). In substance abuse treatment, precontemplators had often not experienced severe consequences from their substance use and typically denied that their use could be hazardous (Center for Substance Abuse Treatment, 1999). Precontemplators

are often characterized as resistant to change, lacking in knowledge, denying the existence of a problem, and often describe change as hopeless (Prochaska et al., 1994; Prochaska & Velicer, 1997). Prochaska et al. (1992) described precontemplators in the following passage:

Families, friends, neighbors, or employees, however, are often well aware that the precontemplators have problems. When precontemplators present for psychotherapy, they often do so because of pressure from others. Usually they feel coerced into changing the addictive behavior by a spouse who threatens to leave, an employer who threatens to dismiss them, parents who threaten to disown them, or courts who threaten to punish them. They may even demonstrate change as long as the pressure is on. Once the pressure is off, however, they often quickly return to their old ways. (p. 1103)

Prochaska et al. (1992) noted that participants with no intent to change the targeted behavior in the next six months were labeled as precontemplators.

Contemplation is the second stage of change in TTM. Individuals in the contemplation stage are characterized as acknowledging there is a problem, and beginning to think about what actions to take in order to solve the problem. DiClemente (2005) described contemplation as the stage where individuals begin “weighing the pros and cons of a new decision” (p. 6). Individuals can remain in this stage for long periods of time as they make the decision to move forward or not engage in change (Center for Substance Abuse Treatment, 1999). Prochaska & Velicer (1997) compared 12 studies of risky behaviors and concluded that as a rule of thumb, “the pros of changing must increase twice as much as the cons decrease” to progress from precontemplation to

contemplation (p. 42). In other words, there is an internal thought process of deciding whether the contemplated changes will have the desired effect. Prochaska and DiClemente (1983) described the contemplation stage for smokers as “subjects are most likely to respond to feedback and education as sources of information about smoking,” and “contemplators report feeling and thinking about themselves in relationship to their problem behavior” (pp. 393-394). Prochaska and Velicer (1997) add that, unlike precontemplators, contemplators intend to make a change in the next six months. However, Prochaska et al. (2005) described chronic contemplators as individuals who are continually substituting thinking for action, and never seem to make the steps necessary to move to the action stage.

Preparation is the third stage of TTM. The preparation stage is most often associated with planning. This stage is also characterized by ambivalence. Individuals may have made a plan, announced to others their plan, but may still be trying to convince themselves to follow through with taking action (Prochaska et al., 1994). Another description of the preparation stage “entails and examination of one’s perceived capabilities—or self-efficacy—for change” (Center for Substance Abuse Treatment, 1999, p. 18). Prochaska and Velicer (1997) describe the preparation stage as preparing to take “action in the immediate future, usually measured in the next month” (p. 39). DiClemente (2005) stated, “The individual must complete the tasks of the preparation stage summoning and creating the commitment and a plan” (p. 6). Implementation of the plan is conducted in the action stage.

Action is the fourth stage of TTM. The action stage, according to DiClemente\ (2005), is described as “the beginning of the shift from the status quo to the new behavior

where the change plan is implemented, revised, and reformed in order to begin a new pattern of behavior that can remain stable over a significant period of time” (p. 6). This stage, therefore, is characterized by overt measurable actions that can be observed, usually over the last six months (Prochaska & Velicer, 1997). However, not all actions taken by individuals in the action stage are considered part of the change process. Prochaska and Velicer (1997) outlined that individual behavior, to be identified as progression in the action stage, “must attain a criterion that scientists and professionals agree is sufficient to reduce risks for disease” (p. 39). Prochaska et al. (1994) warned that action is often viewed as permanent behavior change instead of progression toward the maintenance stage.

Maintenance is the fifth stage of TTM. The maintenance stage is often associated with behavior change and lasting change. Prochaska and Velicer (1997) described smoking cessation participants in the maintenance phase as individuals applying actions necessary to avoid relapse, and placement in this stage can last anywhere from six months to five years. Prochaska et al. (1994) reported the maintenance stage lasting at least six months, but that individuals may spend a lifetime in the maintenance phase implementing a particular change. DiClemente (2005) described the maintenance stage as “the integration of the new behavior into the individual’s lifestyle where it can now become habitual and the new normative pattern of behavior” (p. 6). However, the formation of a new habit does not always guarantee permanent change. Relapse, therefore, is considered part of the change process as individuals recycle through the stages of change (Prochaska et al., 1994; Prochaska et al., 1992). Differing from the wheel model representation of the stages of change found in Figure 2, more recent

models portray the stages of change and progression through the stages as a spiral model, where individuals can exit (relapse) and re-enter the change process at various times in the change model. Prochaska et al. (1992) stated that “relapse and recycling through the stages of change occur quite frequently as individuals attempt to modify or cease addictive behaviors” (p. 1104). Figure 3 is a spiral representation of the stages of change.

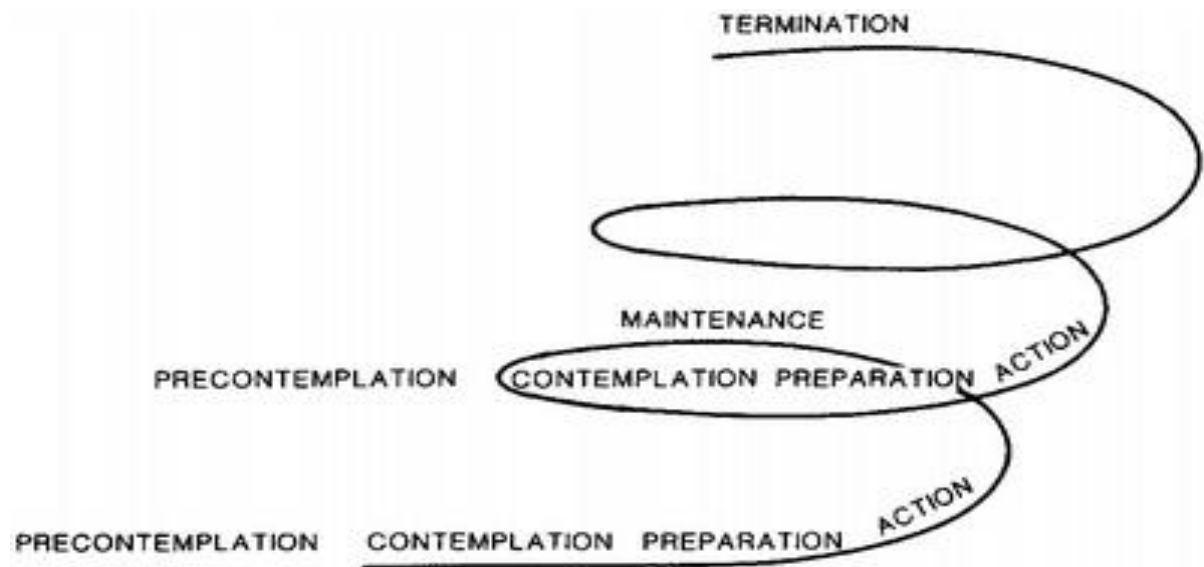


Figure 3. Spiral model of the stages of change. Adapted from Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, 47(9), 1102-1114.

Although this study focuses on a five stage TTM construct, there is often a sixth stage associated with TTM. Termination, the sixth stage, is recognized as the extinction of the targeted behavior (Prochaska et al. 1994). Prochaska and Velicer (1997) described termination as “the stage in which individuals have zero temptations and 100% self-efficacy” (p. 39). Prochaska et al. (1994) warned that there is debate about whether termination of a behavior really occurs, or if the final stage is really just constant maintenance.

Processes of Change. Accompanying each of the stages of change are descriptions of specific tasks that must be completed in order to move from one stage of change to another. These tasks are referred to as the processes of change (Prochaska & DiClemente, 1983). Prochaska et al. (1992) described the processes of change in the following way:

Change processes are covert and overt activities and experiences that individuals engage in when they attempt to modify problem behaviors. Each process is a broad category encompassing multiple techniques, methods, and interventions traditionally associated with disparate theoretical orientations. These change processes can be used within therapy sessions, between therapy sessions, or without therapy sessions. (p. 1107)

According to Prochaska and DiClemente (1985), research has identified a specific set of processes of change identified across a number of targeted problems. Prochaska and DiClemente (1983) identified the following 10 change processes and their description pertaining to smoking cessation:

1. Consciousness Raising: I look for information related to smoking.
2. Self-Liberation: I tell myself I am able to quit smoking if I want to.
3. Social Liberation: I notice that public places have sections set aside for nonsmokers.
4. Self-Reevaluation: My depending-on cigarettes makes me feel disappointed in myself.
5. Environmental Reevaluation: I stop to think that smoking is polluting the environment.

6. Counterconditioning: I do something else instead of smoking when I need to relax.
7. Stimulus Control: I remove things from my place of work that remind me of smoking.
8. Reinforcement Management: I am rewarded by others if I don't smoke.
9. Dramatic Relief: Warnings about health hazards of smoking move me emotionally.
10. Helping Relationships: I have someone who listens when I need to talk about my smoking. (p. 392)

These change processes, therefore, “represent the active ingredients that are used to accomplish the tasks of the stages” (DiClemente, 2005, p. 7).

A study using longitudinal data has shown there are similarities and significant differences in the processes of change, perceived benefits/ramifications, and temptations experienced by smokers. Schumann et al. (2005) surveyed 786 smokers two times (six months apart), assessing similarities and differences in stage of change and processes employed by individuals. Summarizing the findings, participants in precontemplation and those moving towards abstinence often employed some of the same processes of change; however, Schumann et al. (2005) concluded that “more frequent use of the processes of change, less pros of smoking, and less situational temptations are generally associated with progression, whereas less frequent use of the processes of change, more pros, and more temptations tended to be associated with regression” (p. 7). Schumann et al. (2005) reported that the findings of this study were important because they support the constructs of TTM by employing longitudinal research.

Stage matching. Targeted change interventions can be applied when the stage of change is recognized and there is greater understanding of the processes of change. According to Prochaska and Velicer (1997), one of the main assumptions of TTM is that once the stage of change is identified, the appropriate interventions can be applied based on the processes of change. Prochaska et al. (1992) stated, “Probably the most obvious and direct implication of our research is the need to assess the stage of a client’s readiness for change and to tailor interventions accordingly” (p. 1110).

The process of stage-matched interventions can occur at the group or individual level. For example, Prochaska et al. (2004) analyzed a case study involving a university in the northeastern United States and concluded the following:

Maximum impacts of major problems like alcohol abuse on campuses can best be accomplished when intervention strategies apply principles and processes that can produce change at each stage of change...They will also need to assess their campus for students’ readiness to adopt action criteria for drinking. The more their students are in Precontemplation the more resources they will need to dedicate...By applying TTM principles and resources that can be inclusive for people at each stage and each level, interventions of alcohol abuse can maximize participation at each level which can maximize impacts across the organization. (p. 47)

However, Prochaska and Velicer (1997) also warned that applying the wrong intervention strategies to the inappropriate stage of change can, in some cases, exacerbate the targeted problem. This study, however, will focus mainly on the identification of the stage of change and not identifying interventions or processes of change.

TTM application. TTM and its constructs have been adopted in many fields of health and research. For example, Prochaska and DiClemente (1983) applied TTM to smoking cessation efforts. Prochaska and Velicer (1997) identified the following areas of TTM application:

...alcohol and substance abuse, anxiety and panic disorders, delinquency, eating disorders and obesity, high-fat diets, AIDS prevention, mammography screening, medication compliance, unplanned pregnancy prevention, pregnancy and smoking, radon testing, sedentary lifestyles, sun exposure, and physicians practicing prevention medicine. (pp. 37-38)

Other areas of TTM research include the following: physical activity and exercise (Bezyak et al., 2011; Lee, 1993), organizational change (Boswell, 2011; Levesque et al., 1999), high risk sexual behavior/HIV/condom use (Bowen & Trotter, 1995; Galavotti et al., 1995; Velasquez et al., 2009), smoking (Armitage & Arden, 2008; Carbonari et al., 1999; Segan et al., 2004), clinical supervision (Aten, Strain, & Gillespie, 2008), gambling addiction (Petry, 2005), diet and healthy food choice (Armitage, Sheeran, Conner, & Arden, 2004), mammography adoption (Lauver, Henriques, Settersten, & Bumann, 2003; Rakowski, Fulton, & Feldman, 1993), batterer treatment (Scott & Wolfe, 2003), physician quality improvement (Levesque et al., 2001), psychotherapy and counseling processes (Brogan, Prochaska, & Prochaska, 1999; Smith, Subick, & Kalodner, 1995), eating disorders (Levy, 1997), survivors of childhood sexual abuse (Koraleski & Larson, 1997), and college student drinking (Migneault, Velicer, Prochaska, & Stevenson, 1999; Vik, Culbertson, & Sellers, 2000).

Criticisms and algorithms. TTM is not without its detractors, and criticisms of TTM are found in the literature. For example, Sutton (2001) argued there are disproportionate numbers of TTM studies focusing on smoking cessation compared to other areas of research. Therefore, further research is necessary to establish the applicability of TTM constructs to other research areas, despite the fact that TTM has been applied, and continues to be evaluated in several areas of health research (Prochaska & Velicer, 1997). For example, Wright, Wayne, and Prochaska (2009) assessed how well TTM constructs used in smoking cessation research translated to dietary fat intake. They concluded "...predictions can be made with a moderate to high degree of accuracy on whether the use of TTM constructs predicts stage transition in dietary fat intake" (p. 232).

Another criticism of TTM provided by Sutton (2001) and Herzog (2008) was the claim that researchers have not been consistent with their identification and measurement of the stages of change. For example, Sutton (2001) argued "that because rigid stage definition is a major construct of the TTM model, the lack of staging definition accordance is a fundamental problem that needs to be solved if any progress is to be made in research using the TTM" (p. 180). DiClemente, Schlundt, and Gemmell (2004) concluded "the bad news is that no consistent, single measure of stage status has been used with even one addictive behavior like smoking cessation, let alone across all addictive behaviors" (p. 106). DiClemente et al. (2004) further identified recurring problems in research assessing the stages of change due to ambiguously defined change behavior, poor instrument design, problems inherent in self-report measures, and shifting stage dynamics. Therefore, more research is needed using uniform stage definition and measurement in the assessment of the stages of change and change processes.

Similar to stage definition, Sutton (2001) addressed the use of staging algorithms as a measure of stage of change. A staging algorithm, according to Belding, Iguchi, and Lamb (1996) is a simple instrument used to classify participants in a particular category; and, for the purposes of this study identify participants in one of five stages of change. Sutton (2001) argued that staging algorithms lack common definitions of the stages of change between studies and instruments used to measure the stages of change. Herzog (2008) evaluated research employing staging algorithms by using a model of stage theory and health behavior assessment. Herzog (2008) reported that, according to his evaluation, TTM and its major constructs do not meet the criteria put forth in the assessment model and that the stages of change do not represent separate and distinct categories. Belding et al. (1996) assessed the convergence validity of the Rhode Island Change Assessment scale (URICA) and a staging algorithm. Final analysis of the study concluded that the URICA and staging algorithm did not necessarily “measure the same phenomenon” (Belding et al., 1996, p. 196). However, the authors also suggested that more research was needed to analyze the convergence validity of the URICA and staging algorithms.

In another study, Hodgins (2001) used three common TTM measurement scales and a staging algorithm to determine if a correlation existed between the scales in determining stage of change, and if clinician assessment can produce the same identification of a client’s stage of change. Hodgins (2001) found “agreement among continuous measures of the stages of change for alcohol problems is generally good, both between different measures for participants...and between participants and the clinicians” (p. 94). Hodgins (2001) continued by noting that staging algorithms, although simple to implement, are not governed by standard stage definitions. Guo, Aveyard, Fielding, and

Sutton (2009) used a staging algorithm to assess the stage progression of 4125 adolescent smokers and non-smokers between 1997 and 1999. Final analysis showed “fair validity” of the staging algorithm and non-sequential stage progression for participants (Guo et al., 2009, p. 2038). In a personal communication specifically addressing the validity of stage algorithms, Laforge (personal communication, October 21, 2010) claimed the following:

Papers and posters have been presented demonstrating construct validity of the short alcohol stage algorithmic measure in numerous studies of populations of college students and adults. Construct validity has been replicated in all of these samples, demonstrating the predicted relationships for multiple measures of alcohol use, alcohol problems, decisional balance, situational temptations, and several scales assessing positive processes of change, negative processes of change-resistance-and other measures. At present, data on predictive validity of the construct has not been presented. (para. 3)

Research, therefore, on the use of staging algorithms in stage of change identification is mixed when compared to other instruments, and more research is needed. This study, with the acknowledgement of the above research, will employ the Short Alcohol Stage Algorithm in the assessment of stage of change placement. DiClemente et al. (2004) stated: “However, it is important to remember that any measure attempts to operationalize a construct in a satisfactory manner, but no measure ever achieves a complete representation of a construct” (p. 114).

Another criticism of TTM focuses on whether stage progression signifies improved health or changed behavior. According to Sutton (2001), “The notion that behavior change involves movement through a sequence of discrete stages is an

important idea that deserves further consideration” (p. 183). Callaghan, Taykor, and Cunningham (2007), using data from Project MATCH—a 1,726 participant study matching treatment modalities with participants—measured participant’s stage of change, how much participants drank, and the number of days abstinent. Results indicated that participants who demonstrated forward progression through the stages of change did not improve in their drinking behavior more than participants who remained in precontemplation and contemplation stages. Callaghan et al. (2007) concluded that their findings question the basic assumption of TTM that stage progression is an indicator of improved health or behavior change.

In contrast, a more recent study claimed that stage progression does indicate improved outcomes in alcohol recovery. Heather, Honekopp, Smailes, & UKATT Research Team (2009), analyzing data from the United Kingdom Alcohol Treatment Trial (UKATT), found that participants who consistently moved through the stages of change had better drinking outcomes (Cohen’s $d = 0.68$) compared to pre-action participants ($d = 0.10$). However, like Callaghan et al. (2007), Heather et al. (2009) reported similar results in that chronic pre-action participants either showed significant advancement in drinking outcomes over time, no change, or a decline. Heather et al. (2009) concluded that their study supported TTM and the premise that stage progression does signal improved outcomes in alcohol recovery. Research, therefore, addressing the relationship between stage progression and improvement has produced mixed results, and more research is needed.

Literature Review Summary. TTM is a change model based on identifying and evaluating the stages and processes of individual behavior change. The TTM model

identifies five stages of change, and within each stage there are specific processes of change or tasks most commonly completed in each stage of change. As individuals complete the processes of change, they move from one stage to another. Stage movement and identification, however, are not linear. Stage progression can be spiral in nature with individuals progressing and regressing through the stages as they continue to implement personal change. TTM has been implemented in many areas of health and organizational research. Criticisms of TTM include poor stage definition, lack of common construct definitions, mixed study results, and poor study designs. Despite the criticisms, TTM provides an opportunity to study the dynamic issue of college student binge drinking on college campuses utilizing stages of change as identified by a staging algorithm.

Despite the large amount of research that already exists on college student drinking and intervention strategies, most studies conclude that further research is necessary in identifying key factors associated with college student binge drinking. The problem this study and others often run into is that each college or university campus has a unique culture and student demographic. Although recognized by the literature, no authors identify a research solution. One common suggestion is to conduct large national surveys in order to identify general common factors. However, the large sample size may tend to drown out small differences unique to a campus student culture. This study was hopefully an exception. In order to identify small cultural perceptions and behaviors related to college student binge drinking, this study removed the ability to easily generalize findings to other populations by narrowing the study to one research site. However, by narrowing it, the researcher's intent was to identify small but significant behaviors and perceptions unique to a specific campus in order to guide campus specific

interventions. This strategy may seem at odds with the recommendations, but in reality the literature guides researchers to identify common factors associated with college student binge drinking and then apply strategies applicable to each campus individually. This study, therefore, provided a cost effective strategy for pinpointing behaviors and perceptions of college student drinking through the lens of the Transtheoretical Model of Change and the stages of change in identifying binge drinking students. Intervention strategies associated with the TTM and the stages of change could then be used by administrators, counselors, and student life personnel to guide their individual and on campus intervention strategies.

CHAPTER III

Methodology

The purpose of this study was to explore the application of the stages of change presented in the Transtheoretical Model of Change, a change model based on five stages of intentional change (precontemplation, contemplation, preparation, action, and maintenance) developed by Prochaska and DiClemente (1983), in identifying differences in freshman binge drinking perceptions and behaviors and whether self-identified stage of change is a significant factor in identifying binge drinking students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States.

Research questions. The following questions will guide this study:

1. What are the student demographics, in terms of numbers, gender, age-range, etc. that are self-identified in each stage of change category associated with the TTM, at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
2. What are the differences in alcohol consumption among students between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
3. What are the differences in student perceptions of binge drinking experiences between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by

students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?

4. What are the differences between self-identified stage of change and other factors in the literature associated with identifying binge drinking students?

This chapter reviews the following: (a) participants and sampling, (b) instrumentation, (c) procedures, and (d) design and analysis.

Participants and Sampling

This study, approved by the Human Subjects Committees of two universities, employed two convenience samples solicited from one *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwest United States.

Convenience sampling is when “the researcher selects a sample that suits the purposes of the study and that is convenient” (Gall, Gall, & Borg, 2007, p. 175). While useful for this study, the use of a convenience sample can affect the ability to generalize results to other populations. Gall, Gall, and Borg (2007) wrote: “If a convenience sample is used, the researcher and readers of the report must infer a population to which the results might generalize. The researcher can assist the inference process by providing a careful description of the sample” (p. 175). Therefore, the following demographic information from the 2015-2016 academic year will assist in understanding the unique characteristics of the research setting and sample:

1. Total Enrollment: 11,534
2. Female Students: 4,655
3. Male Students: 5,596
4. Freshman Enrollment: 1,588

5. Race and Ethnicity of Undergraduate Enrollment: Asian American (1%), African American (1%), Hispanic American (9%), American Indian (1%), Native Hawaii (<1%), Multi-Race (4%), Unknown (2%), White (77%), Other (4%)
6. Average SAT Score for Entering Freshman: 1051
7. Average High School GPA of Incoming Freshman: 3.42
8. One-Year Retention Rate: 80%

Sample A (associated with a pilot study) and Sample B were both solicited from the current 2015-2016 freshman class attending a *Carnegie R2: Doctoral Universities – Higher Research Activity* institution located in the northwestern United States, identified for this study (N = 1588). Only full-time freshman students were solicited for this study. The university considers a student full-time when carrying a semester class load of 12 or more credits.

Sample A was solicited for pilot-study purposes. The researcher solicited the email addresses of the 2015-2016 freshman class attending the institution identified for this study. A formal request was made to the Registrar's Office and the email addresses were delivered to the faculty representative of the university collaborating with the researcher for this study. Of the reported 1588 freshman enrollment, the Registrar's office released 1581 email addresses of full-time freshmen students. The discrepancy of 7 email addresses may be due to natural attrition since this study was conducted in the spring 2016 semester, no email address listed, or students requesting that their email address or personal information not be released in the student directory. From this list of 1,581 participant email addresses, 40 participant email addresses were chosen at random to

comprise the pilot study sample (n = 40). Regarding pilot studies, Gall et al. (2007) stated, “For many quantitative and qualitative research studies, two or three participants may be sufficient” (p. 56). Specific details of the pilot-study are addressed in the section entitled Procedures. Sample B (N = 1541) comprised the remainder of the email addresses after subtracting the 40 pilot study participants. It was anticipated that the study population and sample would closely resemble each other for this study.

Instrumentation

Instrumentation for this study included informed consent, the *Alcohol: Stages of Change (Short Form)* developed by Laforge, Maddock, and Rossi (1998), a demographic questionnaire, and a researcher developed questionnaire (Perceptions and Behaviors of High Risk Drinking - PBHRD) exploring differences in the perceptions and behaviors of freshman binge drinking experiences based on relevant literature. The informed consent statement for both the pilot study and research study (see Appendices A & B) provided participants information relevant to the study and its purposes. The informed consent statement notified potential participants of the voluntary nature of study involvement and their ability to discontinue participation at any time.

The *Alcohol: Stages of Change (Short Form)* (see Appendix C) is a “staging algorithm for frequency of high risk drinking” (R.G. Laforge, personal communication, October 21, 2010). The definition of high risk drinking defined by the algorithm, five or more drinks in a row for males and four or more drinks in a row for females (Laforge et al., 1998), is the same 5/4 gender specific definition of binge drinking advocated by Wechsler et al. (1995). Therefore, for the purpose of this study *high risk drinking* will be replaced with the term *binge drinking* and was defined as “a pattern of drinking alcohol

that brings blood alcohol concentration (BAC) to 0.08gram percent or above. For the typical adult, this pattern corresponds to consuming 5 or more alcoholic drinks in a row (for males) and 4 or more alcoholic drinks in a row (for females), in about two hours” (CAS, 2001; NIAAA, 2004; Wechsler et al., 1995; Wechsler, Lee, Kuo et al., 2002).

The *Alcohol: Stages of Change (Short Form)* was used to address Research Questions 2, 3, and 4. Permission to use this instrument was obtained through the CPRC website (see Appendix D), and through email correspondence from Dr. Laforge (personal communication, October 21, 2010) (see Appendix E). Addressing the research questions required respondents to be placed in one of five categories related to the Transtheoretical Model of Change (*precontemplation, contemplation, preparation, action, maintenance*); or in one category not related to the theory but included in the *Short Form* and relevant to the study (*non-binge drinker*). The *Alcohol: Stages of Change (Short Form)*, as a staging algorithm, allowed respondents to self-determine which stage of change they were placed in by responding to a series of six questions. Concerning staging algorithms, Dr. Laforge (personal communication, October 21, 2010) wrote the following:

The algorithmic method of stage classification is designed to create "meaningful" mutually exclusive stage categories. These stage categories can then be used to target population groups with interventions appropriately matched to the motivational readiness of the group, or to tailor stage appropriate intervention messages to the motivational readiness of each individual. (¶ 1)

The stage algorithm, therefore, generated nominal data identifying the stage of change (dependent variable) relevant to each respondent.

Accompanying the *Alcohol: Stages of Change (Short Form)* was a demographic questionnaire used to generate nominal demographic data (see Appendix C).

Demographic information included the following:

1. Gender: (male/female)
2. Age: (18-20, 21-23, 24+)
3. Race/Ethnicity: (Asian American, African American, Hispanic American, American Indian, Native Hawaii, Multi-Race, Unknown, White)
4. Student Status: (Full Time/Part Time)
5. Relationship Status: (Single, never married) (Married or Domestic Partnership)
(Divorced) (Widowed) (Separated)
6. Residence: (On Campus Housing, Off Campus Housing)
7. Do you plan on pledging for a Fraternity or Sorority your first year of college?
(Yes) (No)

Demographic data were useful in responding to Research Questions 1 and 3.

The Perceptions and Behaviors of High Risk Drinking (PBHRD) (see Appendix F), a researcher-developed questionnaire, was used to determine alcohol consumption levels, and to explore differences in the perceptions and behaviors associated with the freshman binge drinking experiences (independent variable) of each respondent since the beginning of the 2015 school year. This questionnaire was drafted by the researcher based on the literature, and employs ordinal questions determining alcohol consumption rates, nominal yes/no inquiries, and questions utilizing a five-point Likert scale, which is a common scale used in attitude assessment and measuring students' perceptions of their binge drinking experiences (Gall et al., 2007). The initial draft instrument was reviewed

by four professionals active in the field of drug and alcohol research for a review of face validity and expert opinion. Gall et al. (2007) suggested, “Examination of the test is particularly important to answer questions about the face validity and content relevance of the test” (p. 24). Feedback from the experts did not produce any major changes to the PBHRD. Feedback included comments on question wording, questions regarding how much time creates a binge drinking incident, and ways of measuring alcohol consumption other than self-report. One reviewer, with extensive knowledge concerning drug and alcohol assessment, acknowledged that the themes and wording of questions in the PBHRD were similar to questions found in The Michigan Alcohol Screening Test (MAST) and one question on the CRAFFT Screening Interview. Both instruments were then consulted and questions were reviewed for wording and meaning. In order to maintain consistency between instruments and measurements used in this study, the researcher decided to make no changes to the PBHRD questions or content based on expert review.

A pilot study was conducted to test the validity and reliability of the PBHRD instrument. Gall et al. (2007) stated, “If you develop an attitude scale for your questionnaire study, you should pilot-test in order to check its reliability and validity” (p. 235). Forty students (sample A) were solicited from the institution described in this study to participate in a pilot study of the PBHRD instrument. Pilot study participants were solicited from the 2015-2016 freshman class. Pilot study sampling procedures are explained in detail in the section titled Sampling.

Cronbach’s alpha was employed to determine the reliability of the Likert scale questions contained in the PBHRD. Cronbach’s alpha “is a measure of internal

consistency, that is, how closely related a set of items are as a group” (Introduction to SAS, 2007, ¶ 1). Gliem and Gliem (2003) explained:

Cronbach’s alpha is a test reliability technique that requires only a single test administration to provide a unique estimate of the reliability for a given test.

Cronbach’s alpha is the average value of the reliability coefficients one would obtained for all possible combinations of items when split into two half-tests.

(p. 84)

Gliem and Gliem (2003) also acknowledged that Cronbach’s alpha is a commonly used test of reliability when assessing Likert-scale instruments. Therefore, Cronbach’s alpha was employed as a measure of internal reliability for the PBHRD. According to Gall et al. (2007), “In general, tests that yield scores with a reliability of .80 or higher are sufficiently reliable for most research purposes” (p. 200). Based on the results from Cronbach’s alpha, two questions were removed from the pilot study questionnaire. Details concerning Cronbach’s alpha, the PBHRD, and the two removed questions are discussed at length in Chapter IV.

The PBHRD questionnaire generated ordinal data measuring the number of times a student has engaged in binge drinking since the beginning of the academic year.

Analysis of this information paired with stage of change data and demographic data was used to respond to Research Question 3. Data from the PBHRD in combination with the staging algorithm were compared in identifying which factors account for variances in binge drinking to respond to Research Question 4.

Procedures

This study utilized the following research methods: (a) convenience sampling, (b) a pilot study, (c) an existing questionnaire, (d) a demographic questionnaire, (e) study implementation, (f) a researcher-developed questionnaire, and (g) data analysis.

The convenience sample was obtained through correspondence with the university Registrar and identification of the 2015-2016 freshman class email addresses, at a *Carnegie R2: Doctoral Universities – Higher Research Activity* university in the northwestern United States. Email addresses were used by the researcher for corresponding with students about this study. One of the Human Subjects Boards consulted for this project suggested that the Registrar or the school send out the required emails for the study to more fully ensure confidentiality for the participants involved. It was determined that the email addresses would be given to the university's faculty representative of this study and that the emails would be sent from a university email account. The researcher did not have direct access to the email addresses and participants were therefore provided another level of anonymity when participating in the study.

Email addresses and any other personal demographic data gathered in the course of this study were kept confidential. Student email addresses were unknown to the researcher and data gathering did not employ IP or email address tracking. Therefore, demographic and response data were not directly identifiable with a university email address or student. Data were stored on two password protected jump drives. One jump drive contained working data and the second was used as a backup in case of data contamination or damage. Both jump drives were kept in the researcher's possession.

Statistical analyses were conducted and stored on the researcher's password protected computer.

The researcher employed the use of an electronic survey service to distribute research information, and gather data. Survey Monkey, a secure online survey service, was used to deliver the informed consent and questionnaires to individual students. A secure and encrypted email account was used to send all correspondence to participants, including informed consent and a link to the Survey Monkey survey.

A timeline was used to guide the procedures of this study. The first email to participants consisted of informed consent and the link to the Survey Monkey survey that contained the demographic questions, an electronic version of the *Alcohol: Stages of Change (Short Form)*, and the *Perceptions and Behaviors of High Risk Drinking (PBHRD)*. Participants wishing not to participate in the study were able to indicate that they were not willing to participate by either not responding to researcher's emails or by indicating their desire not to participate in the study after reading the informed consent. Email addresses of participants wishing not to participate in the study were deleted and excluded from the reminder emails. Students under the age of 18 were not permitted to participate in the study. Participants under the age of 18 and participants who did not respond to emails or indicated they did not want to participate in this study contributed to participant mortality. Participant mortality affected sample size.

Study implementation consisted of following a timeline of events for the dissemination, gathering, and initial analysis of data. The first email inviting participation in the study was sent to students in March of 2016. This email contained informed consent and the Survey Monkey link to the survey containing the demographic

questionnaire, the *Alcohol: Stages of Change (Short Form)*, and the *Perceptions and Behaviors of High Risk Drinking (PBHRD)*. Seven days later, a second email was sent to students with the same information as first email. Finally, three days after the second email, a final reminder email was sent consisting of the same information as the first two emails. Data gathering discontinued 14 days after the first email. An in-depth review of data analysis according to each Research Question is in the section titled Design and Analysis. Results of statistical analysis regarding each Research Question are presented in Chapter IV.

Design and Analysis

This study employed a quantitative research design. Sample data were gathered and analyzed using the appropriate statistical procedures with the help of the Statistical Package for the Social Science (SPSS) software.

Research Question 1.

What are the student demographics, in terms of numbers, gender, age-range, etc. that are self-identified in each stage of change category associated with the TTM, at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?

Data derived to respond to Research Question 1 were descriptive and were analyzed by reporting response frequencies with corresponding percentages, and measures of central tendency.

Research Question 2.

What are the differences in alcohol consumption among students between each stage of change (precontemplation, contemplation, preparation, action,

and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?

Data derived to address Research Question 2 were ordinal in nature and were reported between each stage of change. Within each stage of change corresponding percentages were used to identify differences in alcohol consumption rates, and Analysis of Variance (ANOVA) was employed to determine if there were statistically significant differences in alcohol consumption rates between the stages of change identified in this study (Myers & Well, 2003).

Research Question 3.

What are the differences in student perceptions and behaviors of binge drinking experiences between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?

Data derived to address Research Question 3 consisted of nominal and ordinal (Likert-scale) data. Kruskal-Wallis non-parametric test was employed to determine if there were significant differences in students between the stages of change (Myers & Well, 2003). Whenever significant differences were found, an automatic post hoc analysis of all pairwise contrast Dunn-Bonferroni omnibus test (hereafter referred to as Bonferroni), was employed to identify which mean ranks were significantly different (IBM, n.d.; Myers & Well, 2003). Chi-square tests were employed to in place of the Kruskal-Wallis when nominal data was present (Myers & Well, 2003). Post hoc analysis for the Chi-

square tests included a procedure outlined by Beasley and Schumacker (1995) as a way to conduct multiple regression analysis of contingency tables.

Research Question 4.

What are the differences between self-identified stage of change and other factors in the literature associated with identifying binge drinking students?

Stepwise Multiple Regression Analysis was employed to answer Research Question 4.

This analysis allowed the researcher to identify which factors identified in the Perceptions and Behaviors of High Risk Drinking (PBHRD) accounted for the greatest influence or variance in identifying binge drinking behavior.

Methods Summary

This chapter focused on the methodologies employed in this study. Specifically, researcher activities and explanations described the following: (a) participants and sampling, (b) instrumentation, (c) procedures, and (d) design and analysis. Detailed explanation of participants and sampling procedures included participant solicitation and sample selection. Instrumentation included the *Alcohol: Stages of Change (Short Form)* developed at the University of Rhode Island Cancer Prevention Research Center (CPRC), a demographic questionnaire developed by the author, and the Perceptions and Behaviors of High Risk Drinking (PBHRD) questionnaire developed by the author. Procedures provided a sequence of research activities and a timeline of research events for the development of the research sample, data gathering, and analysis. The design and analysis for this study employed a quantitative design with the following forms of data analysis: response frequencies, percentages, measures of central tendency, Kruskal-Wallis, Dunn-Bonferroni Post Hoc, Chi-square, multiple regression analysis for

contingency tables (Beasley & Schumacker, 1995) as a post hoc procedure, and Regression Analysis. The methodology outlined in this chapter provided the steps and procedures necessary to more fully understand the relationship between TTM, binge drinking, and college freshman. An in-depth explanation of research results is provided in Chapter IV.

CHAPTER IV

Results

The purpose of this study was to explore the application of the stages of change presented in the Transtheoretical Model of Change, a change model based on five stages of intentional change (precontemplation, contemplation, preparation, action, and maintenance) developed by Prochaska and DiClemente (1983), in identifying differences in freshman binge drinking perceptions and behaviors and whether self-identified stage of change is a significant factor in identifying binge drinking students at *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States. The following questions guided the study:

1. What are the student demographics, in terms of numbers, gender, age-range, etc. that are self-identified in each stage of change category associated with the TTM, at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
2. What are the differences in alcohol consumption among students between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
3. What are the differences in student perceptions and behaviors of binge drinking experiences between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the

TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?

4. What are the differences between self-identified stage of change and other factors in the literature associated with identifying binge drinking students?

This chapter presents the results of the quantitative statistical analyses related to the research questions. The analyses address the sample/response rates, demographic characteristics of the sample, and results presented in a format that provides answers specific to each research question.

Pilot Study

A pilot study of $n = 40$ participants was conducted to test the reliability and validity of the PBHRD, a researcher-developed survey instrument. The response rate for completed PBHRD surveys was 5. According to Gall et al. (2007), “For many quantitative and qualitative research studies, two or three participants may be sufficient” (p. 56). Pilot study participants included one female and four male participants, all of whom were full-time freshman students.

A Cronbach’s alpha test was used to determine the reliability and validity of the Likert scale items of the PBRHD. Cronbach’s alpha “is a measure of internal consistency, that is, how closely related a set of items are as a group” (Introduction to SAS, 2007, ¶ 1). Gliem and Gliem (2003) explained:

Cronbach’s alpha is a test reliability technique that requires only a single test administration to provide a unique estimate of the reliability for a given test.

Cronbach’s alpha is the average value of the reliability coefficients one would

obtain for all possible combinations of items when split into two half-tests. (p. 84).

Gliem and Gliem (2003) stated that Cronbach's alpha is a commonly used test of reliability when assessing Likert-scale instruments. Questions 11-29 of the PBHRD used a 5-point Likert scale, ranging from "strongly agree" to "strongly disagree." These questions focused on the perceptions and behaviors of participants in regard to high risk drinking. Items 19 and 24 of the PBHRD were determined by SPSS to have zero variance and were removed from the scale by SPSS. Results of a Cronbach's alpha test for the 17 remaining questions was (-.193). Concerning a negative value for α , Nicholas (1999) wrote the following:

If one encounters a negative value for α , implying a negative average covariance among items, the first thing that should be checked is to see whether data or item coding errors are responsible. A common problem of this type is that the scale consists of some items that are worded in opposite directions to alleviate response biases, and the researcher has forgotten to appropriately recode the reverse scored items, resulting in negative covariances where the actual covariances of interest are positive. (par. 10)

Therefore, the PBHRD was evaluated for negative coded items.

Items 12, 13, 14, 16, 18, 19, 21, 22, 24, 26, 28, and 29 were identified by the researcher as negatively worded and were reverse scored. Reverse scoring, according to Furr (n.d.), is the process of recoding "responses so that high "scores" on the item indicate high levels of the attribute being measured (and so that low scores indicate low levels of the attribute)" (par. 5). In other words, if "strongly agree" was coded as a "5"

and “strongly disagree” a “1,” then reverse coding would re-code “strongly agree” as a value of “1” and “strongly disagree” as a “5,” thus reversing the value of the scale for negatively worded questions. Furr (n.d.) also wrote, “The logic of reverse-scoring works for most self-report questionnaires that include a mixture of positively-keyed and negatively-keyed items” (par. 8). Following recoding, the new scale produced a positive Cronbach’s alpha result (17 items; $\alpha = .562$).

Next, the 17 items from the Cronbach’s alpha test were evaluated to see if removal of one or more of the questions would significantly increase α and therefore increase the internal reliability of the PBHRD in measuring perceptions and behaviors of binge drinking. When generating output for Cronbach’s alpha, SPSS creates a table identifying an adjusted value for α based on any one item’s deletion from the evaluated scale. This table indicated that deletion of question 26 (corrected item total correlation = -.951) from the PBHRD would significantly increase the internal reliability of the PBHRD (16 items; $\alpha = .733$). The researcher determined that an increase in α as a measure of reliability from .562 to .733 would justify the deletion of question 26. According to Bland and Altman (1997), a reported Cronbach’s alpha of $<.08$ and $>.07$ is acceptable. Question 26 was deleted from the PBHRD, and results from a second Cronbach’s alpha test confirmed an increase in α (16 items; $\alpha = .733$). A second evaluation of the PBHRD questions determined that removal of Question 20 would further increase the Cronbach’s alpha results (15 items; $\alpha = .806$). The researcher again determined that an increase in α as a measure of reliability from .733 to .806 justified the deletion of Question 20 from the PBHRD. According to Gall et al. (2007), “In general, tests that yield scores with a

reliability of .80 or higher are sufficiently reliable for most research purposes” (p. 200). A copy of the PBHRD used in the main study is found in Appendix G.

Sample/Response Rate

Following completion of the pilot study and the removal of questions 26 and 20 from the PBHRD, the main body of research continued with the remaining 2015-2016 freshman class. Of the reported 1588 freshman enrollment, the Registrar’s office released 1581 email addresses for this study. The missing 7 email addresses were possibly due to a missing email address in the student directory, student attrition, or students not releasing their email addresses to the student directory. The 40 email addresses used for the pilot study were also excluded from the main study to prevent these 40 participants from participating twice or from having prior exposure to the survey instrument. Therefore, the study population was 1541, of which 245 surveys were returned. Data cleanup discovered 4 participants who declined to participate in the study and 14 incomplete surveys. Participants who declined to take part in the study and/or returned incomplete surveys (missing more than one question) were removed from data analysis. Therefore, the response rate for this study was 14.7 % (n = 227).

Stage of Change Review

This section provides a quick overview of the Stages of Change presented in the Transtheoretical Model of Change. Much of the information and data analysis is identified and explained based upon the self-identified stage of change reported by participant. For this study, the five stages of change (precontemplation, contemplation, preparation, action, and maintenance) and a non-binge drinker group were used in data analysis, reporting, and interpretation. The following overview will be helpful to the

reader in interpreting the results in Chapter IV and the discussion in Chapter V as related to college student binge drinking.

The stages of change represent tasks that must be completed before moving on to the next stage or phase of change. The tasks support each other, and as one stage is completed, the groundwork is laid for the next stage to begin. DiClemente (2005) explained stage progression in the following way:

Individuals can move forward, backward, and recycle through the stages. Some people become stuck in certain stages like precontemplation and contemplation for long periods of time. Others consider change and then reject it and return to precontemplation. Still others make a decision and a plan and fail to implement it. So according to the model the only way to be successful in making change is to do all of the tasks well enough to successfully create a new pattern of behavior. (pp. 6-7)

The five stages of change associated with the TTM model most recognized today include precontemplation, contemplation, preparation, action, and maintenance (Sutton, 2001).

Precontemplation is the first stage of change in TTM. According to Prochaska et al. (1994), individuals identified in the precontemplation stage “usually have no intention of changing their behavior, and typically deny having a problem” (p. 40). In substance abuse treatment, precontemplators often have not experienced severe consequences from their substance use and typically deny that their use could be hazardous (Center for Substance Abuse Treatment, 1999). Precontemplators are often characterized as resistant to change, lacking in knowledge, denying the existence of a problem, and often describe change as hopeless (Prochaska et al., 1994; Prochaska & Velicer, 1997).

Prochaska et al. (1992) noted that participants with no intent to change the targeted behavior in the next six months were labeled as precontemplators.

Contemplation is the second stage of change in TTM. Individuals in the contemplation stage are characterized as acknowledging there is a problem and beginning to think about what actions to take in order to solve the problem. DiClemente (2005) described contemplation as the stage in which individuals begin “weighing the pros and cons of a new decision” (p. 6). Individuals can remain in this stage for long periods of time as they make the decision to move forward or not engage in change (Center for Substance Abuse Treatment, 1999). Prochaska et al. (2005) described chronic contemplators as individuals who are continually substituting thinking for action and never seem to make the steps necessary to move to the action stage.

Preparation is the third stage of TTM. The preparation stage is most often associated with planning. This stage is also characterized by ambivalence. Individuals may have made a plan, announced to others their plan, but may still be trying to convince themselves to follow through with taking action (Prochaska et al., 1994). Another description of the preparation stage “entails an examination of one’s perceived capabilities—or self-efficacy—for change” (Center for Substance Abuse Treatment, 1999, p. 18). Prochaska and Velicer (1997) described the preparation stage as preparing to take “action in the immediate future, usually measured in the next month” (p. 39).

Action is the fourth stage of TTM. The action stage, according to DiClemente (2005), is described as “the beginning of the shift from the status quo to the new behavior where the change plan is implemented, revised, and reformed in order to begin a new pattern of behavior that can remain stable over a significant period of time” (p. 6). This

stage, therefore, is characterized by overt measurable actions that can be observed, usually over the last six months (Prochaska & Velicer, 1997).

Maintenance is the fifth stage of TTM. The maintenance stage is often associated with behavior change and lasting change. Prochaska and Velicer (1997) described smoking cessation participants in the maintenance phase as individuals applying actions necessary to avoid relapse. Placement in this stage can last anywhere from six months to five years. Prochaska et al. (1994) reported the maintenance stage lasting at least six months but that individuals may spend a lifetime in the maintenance phase implementing a particular change. DiClemente (2005) described the maintenance stage as “the integration of the new behavior into the individual’s lifestyle where it can now become habitual and the new normative pattern of behavior” (p. 6). However, the formation of a new habit does not always guarantee permanent change. Relapse, therefore, is considered part of the change process as individuals recycle through the stages of change (Prochaska et al., 1992; Prochaska et al., 1994).

A sixth group was added for this study—non-binge drinker. Non-binge drinkers were participants who reported having never engaged in binge drinking behavior. This group is significant in recognizing and identifying that not all college students have engaged in binge drinking behavior.

Research Question 1: What are the student demographics, in terms of numbers, gender, age-range, etc. that are self-identified in each stage of change category associated with the TTM? Demographic information regarding participants in this study was gathered to better understand the unique characteristics of the sample. Understanding the unique characteristics of the sample will help other researchers, with caution, make

inferences and generalizations to other settings. Concerning the demographics of the sample, 84 participants identified themselves as male (37%) compared to 143 as female (63%). Despite almost twice as many female as male participants in the study, the number of participants in each gender group that self-identified as *Pre-contemplation* (M=28, F=27) by responding positively to the statement “Yes, and I do not intend to stop drinking 5 (4) or more drinks in a row” from the *Alcohol Stages of Change: Short Form* was almost identical. In both gender groups, however, the greatest number of respondents self-declared as *Non-Binge Drinkers* (M=34, F=49). Of further interest, 31 female participants self-declared the *Action* stage of change compared to 10 male participants. This stage of change is associated with responding positively to the statement “No, but I have had 5 (4) or more drinks in the past 6 months” from the *Alcohol Stages of Change: Short Form*.

Other demographic data associated with this study provide a window into the unique characteristics of the sample. Participants between the age of 18 and 20 made up the majority of the sample (218, 96%), while there were 9 participants age 21 or older. The majority of participants self-identified belonging to the following groups: *Non-Binge Drinkers* (83), *Precontemplation* (55), and *Action* (41).

Although several categories existed for participants to declare race/ethnicity, not every race or ethnic background was represented in the sample. The sample included the following race/ethnic categories: 1) White/Caucasian (190, 83.7%); 2) Hispanic American (21, 9.3%); 3) Multi-Race (8, 3.5%); 4) Asian American (5, 2.2%); and 5) Unknown (3, 1.3%). No participants self-identified as African American, American Indian, or Native Hawaiian. Participants reported their student status as either Full-Time

(221, 97.4%) or Part-Time (3, 0.01%). Concerning Relationship Status, 97.4% (221) of participants reported being *Single, Never Married*. Six participants reported *Married or Domestic Partnership*. Participants did not report any other relationship status. Related to the type of residence, 89% (202) reported living in *On-Campus* housing compared to 11% (25) *Off-Campus* housing. The final demographic category for this study included a question asking participants if they planned on joining a fraternity or sorority. Responses indicated that 64.8% (147) of participants did not plan on joining a fraternity or sorority compared to 35.2% (80) who indicated they were planning to join. Table 1 is a representation of the demographic data broken down by question and Stage of Change.

Table 1.
Demographics Related to Stage of Change

			Stages of Change					
			Pre contemplation	Contemplation	Preparation	Action	Maintenance	Non-Binge Drinker
(n=227)	Overall							
Gender								
Male	84 (37.0%)		28	3	3	10	6	34
Female	143 (63.0%)		27	13	10	31	13	49
Age								
18-20	218 (96.0%)		54	15	13	40	12	83
21-23	4 (0.02%)		0	0	0	1	3	0
24+	5 (0.02%)		0	1	0	0	4	0
Race/Ethnicity								
Asian American	5 (2.2%)		0	1	0	1	0	3
Hispanic American	21 (9.3%)		5	1	2	4	2	7
Multi-Race	8 (3.5%)		1	2	1	1	0	3
Unknown	3 (1.3%)		0	1	1	0	0	2
White/Caucasian	190 (83.7%)		49	12	9	35	17	68
*Student Status								
Part-Time	3 (0.01%)		0	0	1	0	1	1
Full-Time	221 (97.4%)		55	16	11	39	18	82
Relationship Status								
Single, Never Married	221 (97.4%)		55	16	13	39	17	81
Married or Domestic Partnership	6 (2.6%)		0	0	0	2	2	2
Residence								
On Campus Housing	202 (89%)		51	14	13	37	12	75
Off Campus Housing	25 (11%)		4	2	0	4	7	8
Planned Fraternity or Sorority Pledge								
Yes	80 (35.2%)		36	8	6	13	5	12
No	147 (64.8%)		19	8	7	28	14	71

* Indicates missing data points where $n \neq 227$.

* Categories with no respondents: Age (under 18), Race/Ethnicity (African American, American Indian, Native Hawaii); Relationship Status (Divorced, Widowed, Separated)

Data Analysis

Research Question 2: What are the differences in alcohol consumption among students between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM?

Alcohol Consumption. In order to answer *Research Question 2*, ANOVA procedures were to be used in the evaluation of data. However, initial testing of the PBHRD questions showed violations of the normality assumption of ANOVA. When the assumption of normality is violated for an ANOVA, a Kruskal-Wallis test is an appropriate option (Myers & Well, 2003), and according to P. R. Denner (personal communication, October 10, 2006), the Kruskal-Wallis test is also “fairly robust” to violations of the homogeneity assumption (p. 2). Therefore, analysis of the Likert scale questions on the PBHRD was conducted using a Kruskal-Wallis test to compare mean rank differences. Post hoc analysis of the Kruskal-Wallis test is automatically conducted by SPSS by employing a Dunn-Bonferroni (often referred to as Bonferroni) approach (IBM, n.d.). For example, questions 30 and 35 of the PBHRD asked participants to report how many times in the past month (Q30) and semester (Q35) they drank 5 or more drinks in a row (for males) or, 4 or more drinks in a row (for females). In other words, participants were asked how many times in the past month and semester they have engaged in high risk or binge drinking events.

A Kruskal-Wallis test was conducted to evaluate mean rank differences in the number of binge drinking events in the past month (Q30) among the following six groups: five stages of change groups (precontemplation, contemplation, preparation,

action, maintenance) and one non-binge drinking group. The test results were statistically significant, $\chi^2(5, N = 227) = 150.44, p < .00, \eta^2 = .67$.

Post-hoc analysis was conducted to determine which groups were significantly different from each other, using the Dunn-Bonferroni method calculated by SPSS. Post-hoc results revealed that participants in the non-binge drinking and maintenance groups engaged in significantly fewer binge drinking events in the last month than did the precontemplation ($p < .05$), contemplation ($p < .05$), preparation ($p < .05$), and action ($p < .05$) groups. Comparison between non-binge drinking and maintenance showed no significant difference ($p > .05$). There was only one other group comparison that showed a significant result, and that comparison indicated that participants in the action group engaged in significantly fewer binge drinking events in the last month than did the precontemplation group ($p < .05$). Therefore, there was no significant difference among the following pairwise comparisons ($p > .05$): action-preparation, action-contemplation, preparation-contemplation, preparation-precontemplation, or contemplation-precontemplation.

The same Kruskal-Wallis test and Bonferroni post-hoc analysis were used for Q35 to determine if there were significant mean rank differences between the groups and binge drinking events during the semester. The results of this test were also significant after adjusting for two missing cases, $\chi^2(5, N = 225) = 173.97, p < .00, \eta^2 = .78$. However, results for Q35 were identical to the results for Q30. Non-binge drinking and maintenance groups engaged in significantly fewer binge drinking events in the semester than did the precontemplation ($p < .05$), contemplation ($p < .05$), preparation ($p < .05$), and action ($p < .05$) groups. Comparison between non-binge drinking and maintenance

showed no significant difference ($p > .05$). The action group engaged in significantly fewer binge drinking events in the semester than did the precontemplation group ($p < .05$). There was no significant difference among the following pairwise comparisons ($p > .05$): action-preparation, action contemplation, preparation-contemplation, preparation-precontemplation, or contemplation-precontemplation.

In answering *Research Question 2*, results from the analysis of Q30 and Q35 indicated that there were statistically significant difference between the non-binge drinking and maintenance groups engaging in fewer binge drinking events during the past month and throughout the semester compared to their peers in the other groups. Participants in the action group, while having participated in binge drinking events in the past 6 months but not in the last 30 days, also reported significantly fewer binge drinking events than did the precontemplation group within the last month and throughout the semester.

Research Question 3: What are the differences in student perceptions and behaviors of binge drinking experiences between each stage of change?

Questions on the PBHRD addressed two different categories related to binge drinking: 1) student perceptions of binge drinking and 2) student behaviors. Results analysis of *Research Question 3* will combine interpretation of both perceptions and behaviors, seeking to find statistically significant results between the stages of change groups. Analysis will be presented in the following categories: College Drinking, Academic Performance, College Life, Others, Health and Risk. Chi-square, Kruskal-Wallis tests, and Bonferroni post-hoc analysis were used to evaluate each of the questions.

College Student Drinking. Participant perceptions were gathered using a 5-point Likert scale to assess whether just drinking alcohol (Q11) and high risk drinking (Q12) are a “normal” part college of life. The results of a Kruskal-Wallis test comparing the mean ranks of the stages of change groups for Q11 were statistically significant, $\chi^2(5, N = 227) = 59.17, p < .00, \eta^2 = .26$. Post hoc analysis found statistically significant differences between non-binge drinkers and the following groups: precontemplation ($p < .05$), contemplation ($p < .05$), and action ($p < .05$). There was no statistically significant difference between non-binge drinkers and the preparation and maintenance groups ($p > .05$). Only one other comparison produced a statistically significant result: maintenance and pre-contemplation ($p < .05$). Further analysis of Q11 yielded the conclusion that the majority of participants in all six groups agreed that drinking alcohol is a normal part of college life. However, the non-binge drinking group, as a whole, was statistically significantly less likely to conclude that drinking was a normal part of college life compared to the precontemplation, contemplation, and maintenance groups. The maintenance group was statistically significantly less likely to agree with the precontemplation group as well.

Pertaining to the perception that “high risk drinking is a normal part of college life,” results of the Kruskal-Wallis test of Q12 were also found to be statistically significant, $\chi^2(5, N = 226) = 13.94, p < .05, \eta^2 = .06$. Post hoc analysis found a significant difference between the non-binge drinking and precontemplation groups ($p = .47$). No significant differences were found in pairwise comparisons. The greatest number (55.5%) of participants either disagreed or strongly disagreed that high risk drinking was a normal part of college life. The non-binge drinking group was significantly more likely to

conclude that high risk drinking was not a part of college life compared to the precontemplation group. Although there may be some caution in interpreting results of Q12 with a p-value approaching non-significance, but an of effect size of $\eta^2 = .06$. According to Cohen (1988), .06 would be considered a medium effect. Cohen's (1988) measures of effect size are values of .01 (small), .06 (medium), and .14 (large).

Participants were asked to use a 5 point Likert scale to indicate their perception related to whether most students drink to get drunk on campus (Q13) and if professors and school administration are aware of the amount of high risk drinking taking place on campus (Q26). A Kruskal-Wallis test of between group analysis for Q13 yielded statistically significant results, $\chi^2(5, N = 227) = 19.22, p < .05, \eta^2 = .09$. Post hoc analysis found statistically significant differences between precontemplation and the following two groups: action ($p < .05$) and non-binge drinker ($p < .05$). Continued analysis found that 73% of the sample ($n = 227$) strongly agreed or agreed that students drink to get drunk while 10% strongly disagreed/disagreed and 17% had no opinion. However, participants in the precontemplation group were significantly more likely to strongly agree or agree that students drink to get drunk compared to their peers in the action and non-binge drinker groups.

Participants were asked if professors and administrators were aware of the amount of high risk or binge drinking that occurs on campus (Q26). Results of a Kruskal-Wallis test were not statistically significant, $\chi^2(5, N = 227) = 5.15, p = .40$. Therefore, there was no significant difference in mean rank scores between the groups, and no group was more or less likely to perceive professors or administrators knowing the amount of binge drinking that occurs on the campus.

Academic Performance. Participants were asked questions regarding academic performance (Q32, Q15), the perception of missing classes due to binge drinking (Q24, Q14), and actual behavior associated with missing class (Q40). For (Q32), participants were asked to self-identify their current academic performance by reporting grade point average (GPA). Data collected from the sample revealed 51.1% of participants reported a GPA ranging from 3.5-4.0, 33.5% reported a GPA of 3.0-3.49, reported a GPA of 2.5-2.99, 3.1% reported a GPA of 2.0-2.49, and 0.9% reported a GPA below 2.0. Results of a Kruskal-Wallis test comparing academic performance between the stages of change groups were statistically significant, $\chi^2(5, N = 227) = 14.68, p < .05, \eta^2 = .06$. Post hoc analysis found a statistically significant difference between the non-binge drinker and precontemplation groups ($p < .05$). No other pairings of groups yielded statistically significant results for this question. Results indicated that participants in the non-binge drinker group are more likely to have a higher GPA than were participants in the precontemplation group.

A similar question (Q15) prompted participants to indicate on a 5-point Likert scale how strongly they agreed or disagreed that students who engage in binge drinking perform the same academically as non-binge drinking students. Results from the Kruskal-Wallis test were statistically significant, $\chi^2(5, N = 227) = 28.27, p < .05, \eta^2 = .13$. Post hoc testing found statistically significant differences between precontemplation and preparation ($p < .05$) as well as between precontemplation and non-binge drinker ($p < .05$) groups. The lower mean rank score for the precontemplation group indicated that this group was more likely to agree that students who binge drink perform the same academically as their non-binge drinking peers. This perception contrasts with that of

preparation and non-binge drinker groups, who were more likely to disagree that both groups perform the same academically. The precontemplation group was more likely to perceive academic parity with the non-binge drinker group; however, Q32 showed participants from the non-binge drinking group reported a statistically significant higher GPA than their precontemplation (binge drinking) peers.

Participants were asked to identify on a 5-point Likert scale whether it is OK to engage in binge drinking during the week as long as students do not miss class (Q24), and whether it is common to miss class after a night of binge drinking (Q14). Results of a Kruskal-Wallis test comparing the stage of change groups for Q24 were statistically significant, $\chi^2(5, N = 227) = 72.70, p < .00, \eta^2 = .32$. Post hoc analysis confirmed statistically significant differences between precontemplation and the following groups: preparation ($p < .05$), maintenance ($p < .05$), and the non-binge drinker ($p < .05$). Statistical significances were also found between action ($p < .05$), maintenance ($p < .05$) and non-binge drinker ($p < .05$) groups. In other words, the precontemplation group was more likely to agree or strongly agree that it is OK to participate in binge drinking during the week as long as students do not miss class while the preparation, maintenance, and non-binge drinker groups were more likely to perceive that such behavior is not OK. Similarly, the analysis indicated that the action group was significantly more likely to agree or strongly agree that it is OK to participate in binge drinking during the week as long as students do not miss class than either the maintenance or non-binge drinker groups. There were no other statistically significant pairings related to Q24.

The next question (Q14) asked participants to identify whether it is common for students to miss class after a night of binge drinking. Results of a Kruskal-Wallis test

found no statistically significant difference in mean rank between the groups, $\chi^2(5, N = 227) = 9.78, p = .08$. Although there was no statistical significance between the groups pertaining to (Q14), it is interesting to note that 58.2% of the participant sample ($n = 227$), regardless of stages of change group, agreed or strongly agreed that it is common for students to skip class after a night of binge drinking.

Continuing the topic of academic success and classroom attendance, Q40 asked participants to report if they had ever skipped class after a night of binge drinking. Data analysis showed that 85.5% of the sample reported they had not skipped class after a night of binge drinking. Chi-square analysis was conducted and results were statistically significant, but showed a violation of the expected cell counts (25%) as reported by SPSS. Correction for this violation resulted in the reporting of the Likelihood Ratio as the significant statistic, $\chi^2(5, N = 227) = 65.86, p < .00, \phi = .52$. Interpretation of the Chi-square results indicated that there was a significant difference between stages of change groups and skipping class after a night of binge drinking. Post hoc analysis employing the procedure identified by Beasley and Schumacker (1995) yielded significant results for two stages of change groups—precontemplation and non-binge drinkers. Interpretation of the post hoc analysis concluded the precontemplation group was more likely to skip class after a night of binge drinking, $\chi^2(1, N = 227) = 49.42, p < .00$, than the non-binge drinking group, $\chi^2(1, N = 227) = 22.28, p < .00$). When comparing Q14 and Q40 results, it is interesting to note that although more than half of participants agreed it is common to skip classes, regardless of their stages of change grouping, a vast majority (85.5%) reported having not skipped class after a night of binge drinking. This is another example of the discrepancy between perceived behavior versus reported behavior.

The final academic question, Q16, asked participants to rate on a 5-point Likert scale if binge drinking students are more likely to drop out of school than are non-binge drinking students. Results of the Kruskal-Wallis test were statistically significant, $\chi^2(5, N = 227) = 24.72, p < .00, \eta^2 = .11$. Post hoc analysis confirmed significant differences between precontemplation and two other groups—maintenance ($p < .05$) and non-binge drinker ($p < .05$). Participants in the maintenance and non-binge drinker groups were more likely to strongly agree or agree than the precontemplation group that binge drinking students are more likely to drop out of school.

To summarize findings associated with academic questions, results indicated that participants in the non-binge drinker group reported a statistically significantly higher GPA than participants in the precontemplation group. However, compared by stages of change groups, participants in the precontemplation group were more likely to perceive academic parity with the non-binge drinker group, but report a lower GPA. Non-binge drinking and maintenance groups were statistically significantly more likely than the precontemplation group to believe that binge drinking students are more likely to drop out of school. Although there was no significant difference between the groups in the perception that it is common to skip class after a night of binge drinking, precontemplators were statistically significantly more likely to skip class after a night of binge drinking compared to the non-binge drinking group. Last, participants in the maintenance and non-binge drinker groups were more likely to strongly agree or agree that binge drinking students are more likely to drop out of school than their peers in the precontemplation group.

College Life. A major part of college life involves social interactions, gatherings, and on some campuses participation in Greek life. Five questions on the PBHRD examined the association between stages of change groups, Greek life, and social interactions. Participants were asked to identify their intent to join a sorority or fraternity (Q10). The majority of students (64.8 %), not taking into account stages of change grouping, reported no intent to join a sorority or fraternity. However, results of a Chi-square test confirmed a statistically significant relationship between stages of change group and intent to join a sorority or fraternity, $\chi^2(5, N = 227) = 40.80, p < .00, \phi_{\text{cramer}} = .42$. Post hoc analysis results, employing procedures outlined by Beasley and Schumacker (1995), were statistically significant for the precontemplation, $\chi^2(1, N = 227) = 29.05, p < .00$, and the non-binge drinker groups, $\chi^2(1, N = 227) = 24.80, p < .00$. Members of the precontemplation group, therefore, are more likely to intend to join a sorority or fraternity than were their non-binge drinking peers.

Another question from the PBHRD pertained to Greek life and participant perceptions about whether binge drinking was normal at sorority and fraternity parties (Q18), and if most students plan to binge drink at sorority and fraternity parties (Q20). Results from a Kruskal-Wallis test comparing stages of change group and the perception that binge drinking is a normal part of sorority and fraternity parties on “my campus” were not statistically significant, $\chi^2(5, N = 227) = 5.35, p = .38$. Therefore, this study found that stage of change group has no significant effect on the perception that high risk drinking is the norm at fraternity and sorority parties on campus. Descriptive data, a more accurate reflection of student perception for Q18, revealed that 64.3% (n = 146) of

participants strongly agreed or agreed that binge drinking is the norm at fraternity or sorority parties on “my campus.”

The final question regarding Greek life (Q20) asked if most students plan to engage in binge drinking when they attend fraternity or sorority parties. Kruskal-Wallis test results for Q20 were not statistically significant, $\chi^2(5, N = 227) = 8.46, p = .13$. Therefore, stage of change group has no significant effect on the perception that most college students plan to engage in high risk drinking when they attend fraternity or sorority parties. Descriptive data, a more accurate reflection of student perception for Q20, revealed that 68.3% ($n = 155$) of participants strongly agreed or agreed that most college students plan to engage in high risk drinking when they attend fraternity or sorority parties.

To summarize Greek life, there were significant differences between a participant's stages of change groups and the intent to join a sorority or fraternity. However, there was no significant difference between stages of change groups regarding participants' perceptions that binge drinking was a norm at sorority and fraternity parties on campus, or that most students plan to engage in binge drinking at fraternity and sorority parties. Results and interpretation of Greek life related questions continued to support student perceptions and stereotypes that binge drinking is a part of Greek life culture on campus regardless of university policy.

Other questions on the PBHRD focused on the relationship between stages of change grouping and the positive or negative perception binge drinking may have on peer socialization. For example, Q25 using a 5-point Likert scale asked participants if binge drinkers have more fun at parties. From the sample ($n = 227$) we learned that 45.4% of

participants strongly disagreed or disagreed, 30.4% had no opinion, and 24.3% strongly agreed or agreed that binge drinkers have more fun at parties. Kruskal-Wallis test results comparing stages of change groups in regard to Q25 were statistically significant, $\chi^2(5, N = 227) = 23.09, p < .00, \eta^2 = .10$. Post hoc analysis found statistically significant differences in mean rank scores between precontemplation and the following two groups: maintenance ($p < .05$) and non-binge drinker ($p < .05$). Interpretation of this analysis concluded that participants in the precontemplation group were significantly more likely to strongly agree or agree that binge drinkers have more fun at parties than their non-binge drinker and maintenance peers.

Question 17 also used a 5-point Likert scale to determine if participants find it easier to socialize with other students after 4 or 5 drinks. The sample frequencies for this question were almost evenly distributed with 38.4% of participants who strongly agreed or agreed that it is easier to socialize with other students after 4 or 5 drinks, and 38.3% who strongly disagreed or disagreed with this statement. The remaining participants reported having no opinion (23.3%). Kruskal-Wallis test results for Q17 were statistically significant, $\chi^2(5, N = 227) = 82.99, p < .00, \eta^2 = .37$. Post hoc analysis found statistically significant differences in the mean rank score of the maintenance group and three other groups. The non-binge drinker group was statistically different from four stages of change groups. The maintenance and non-binge drinker groups were statistically significantly different ($p < .05$) from the precontemplation, contemplation, and action groups. The non-binge drinker group was also statistically significantly different from the preparation group ($p < .05$). Interpretation of the post hoc test concluded that participants in the precontemplation, contemplation, and action groups were more likely to agree with

their peers in the maintenance and non-binge drinker groups that it is easier to socialize with other students after 4 or 5 drinks. These results support past research.

The final question regarding college life asked students to identify how strongly they agree or disagree with the statement “I spend time during the week trying to figure out which weekend party will have the easiest access to alcohol” (Q19). A frequency distribution for Q19 indicated that 81.5% of the sample ($n = 227$) disagreed or strongly disagreed with Q19. Kruskal-Wallis test results comparing stages of change groups in regard to Q19 were statistically significant, $\chi^2(5, N = 227) = 45.76, p < .00, \eta^2 = .20$. Post hoc analysis found statistically significant differences in the mean rank score of the maintenance group compared to two other groups, and the non-binge drinker group compared to three other stages of change groups. The maintenance and non-binge drinker groups were both statistically significantly different ($p < .05$) than precontemplation, and contemplation. The non-binge drinker group was also statistically significantly different from the action group ($p < .05$). Post hoc results indicated that participants in the maintenance and non-binge drinker group were more likely to disagree with the precontemplation and contemplation groups that “I spend time during the week trying to figure out which weekend party will have the easiest access to alcohol.” The non-binge drinker group was also more likely to disagree with the same statement than the action group.

Health and Risk. Several questions on the PBHRD were concerned with the binge drinking behaviors of participants and their acquaintances at school. Questions focused on personal health and safety, legal problems, the actions of others, and mental health. Questions 33, 34, 36, 37, 39, 41, and 42 were all concerned with the personal

health and safety of students. Question 33 asked participants if they have been a passenger in a car when the driver has been binge drinking. Of the sample, 11% reported they had been a passenger in a car when the driver had been binge drinking. Chi-square results for Q33 were statistically significant, but results showed a violation of the expected cell counts (33%) as reported by SPSS. Correction for this violation resulted in the reporting of the Likelihood Ratio as the significant statistic, $\chi^2(5, N = 227) = 13.07, p < .00, \phi = .24$. Interpretation of the Chi-square found a statistically significant difference between stages of change group and being a passenger in a car when the driver has been binge drinking. Post hoc analysis, using an adjusted Bonferroni value and procedure identified by Beasley and Schumacker (1995), identified the precontemplation group as statistically significant, $\chi^2(1, N = 227) = 8.64, p < .00$. Interpretation of these results indicated that the precontemplation group is more likely to be a passenger in a car when the driver has been binge drinking. These results reflect that precontemplators are more likely to be engaged in activities and gatherings with other students engaged in binge drinking behavior.

Question 34 asked participants if they have experienced unwanted sexual advances from another person who is or has been binge drinking, and 19.4% of the sample answered affirmatively. Analyzing Q34 according to stages of change group, Chi-square test results were not statistically significant, $\chi^2(5, N = 227) = 5.38, p = .37$. In other words, unwanted sexual advances from a person who is or has been binge drinking was neither more nor less likely to occur to participants in one stage of change group compared to another.

Two questions on the PBHRD asked participants to identify if they knew another student who had “passed out” from too much drinking (Q37), and a self-report of how many times participants have experienced memory loss or blackout due to binge drinking Q(36). Frequency distribution for Q37 indicated that 71.4% of participants reported “Yes,” they knew a student who had passed out from drinking too much. Results from a Chi-square test seeking significant differences between stages of change group related to Q37 was not statistically significant, $\chi^2(5, N = 226) = 7.26, p = .20$. Interpretation of the Chi-square indicated that knowing a student who passed out from too much drinking was neither more nor less likely to be true for participants in one stage of change group compared to another.

A similar association between stages of change group and self-reporting the number of times a participant had experienced memory loss or blacked out due to binge drinking (Q36) was tested. Frequency distribution for Q36 indicated that 30.8% of participants reported they had experienced at least one episode of memory loss or blackout due of binge drinking. Results from a Kruskal-Wallis test were statistically significant, $\chi^2(5, N = 226) = 81.21, p < .00, \eta^2 = .36$. Post hoc results identified statistically significant differences between the non-binge drinker group and three other groups. The non-binge drinker group was less likely than the precontemplation ($p < .05$), contemplation ($p < .05$), and action ($p < .05$) groups to experience memory loss or a blackout due to binge drinking. The precontemplation group was significantly more likely to have experienced memory loss or a blackout than participants in the maintenance ($p < .05$) and action ($p < .05$) groups. These results were expected due to non-binge drinkers’ lack of binge drinking behavior compared to precontemplators.

One question on the PBHRD was concerned with legal problems associated with binge drinking. Question 38 asked participants to identify if they have been arrested, spent time in jail, received an alcohol citation, or a DUI/DWI. Distribution frequencies for Q38 indicated that 3.1% of participants answered positively to Q38. A Chi-square test analyzed differences between stages of change groups and results for Q38 were not statistically significant, $\chi^2(5, N = 227) = 6.182, p = .29$. Interpretation of the Chi-square indicated that stages of change group affiliation was not a significant factor in whether a participant had experienced legal consequences due to binge drinking. However, interpretation of this of Q38 must be made with caution because only seven participants from the sample answered affirmatively to Q38; therefore, lack of responses may not reflect the population and may affect the ability to generalize findings to the sample and population sample.

Two questions asked participants to report on hospital visits due to binge drinking. Question 41 asked participants if they knew a student who had been taken to the hospital for drinking too much, and Q42 asked participants to self-report if they had been taken to the hospital for drinking too much. Distribution frequencies for Q41 indicated that 48.9% participants responded affirmative to Q41. Results from a Chi-square test seeking differences between stages of change group and Q41 were not statistically significant, $\chi^2(5, N = 227) = 6.65, p = .25$. Interpretation of the Chi-square concluded there was no difference between stages of change group affiliation and knowing a student who had been taken to the hospital for drinking too much. Chi-square test results for Q42 were not statistically significant, but results showed a violation of the expected cell counts (25%) as reported by SPSS. Correction for this violation resulted in the reporting

of the Likelihood Ratio as the significant statistic, $\chi^2(5, N = 227) = 5.33, p = .38$.

Interpretation of Q42 and the Chi-square results indicated there is no significant difference between stages of change affiliation and being taken to the hospital for drinking too much. Distribution frequencies for Q42 revealed that 98.7% of participants denied going to the hospital for too much drinking.

Question 43 asked participants whether they have had to care for a friend who has engaged in binge drinking the night before, and 67.8% of participants reported positively. Chi-square test results analyzing differences between stages of change groups and Q43 were statistically significant, $\chi^2(5, N = 227) = 17.27, p < .00, \phi_{\text{cramer}} = .28$. Interpretation of the Chi-square indicated there is a significant association between stages of change group and participants who have cared for a friend who engaged in binge drinking the night before. Post hoc results using the procedures outlined by Beasley and Schumacker (1995) were statistically significant for the following two stage of change groups—precontemplation, $\chi^2(1, N = 227) = 12.25, p < .00$, and non-binge drinker, $\chi^2(1, N = 227) = 10.89, p < .00$. Interpretation of the post hoc results concluded that members of the precontemplation group are more likely to care for a friend who engaged in binge drinking the night before while their non-binge drinking peers are statistically less likely to do so. This result may seem obvious if interpreted that precontemplators have more binge drinking peers and are therefore more likely to be in a situation to care for a friend who engaged in binge drinking behavior.

Question 39 asked participants to report if they have embarrassed themselves or did something they regretted when binge drinking. The frequency table showing percentages for Q39 broken down by stages of change groups indicated that 35.2% of

participants answered affirmatively. Of the 80 participants who answered yes, 36 self-identified as being part of the precontemplation group. Results from a Chi-square test analyzing differences between stages of change groups and Q39 were statistically significant, $\chi^2(5, N = 226) = 75.30, p < .00, \phi_{\text{cramer}} = .58$. Interpretation of the Chi-square indicated there is a statistically significant difference between stages of change group and participants who have either embarrassed themselves or did something they regretted when binge drinking. Post hoc analysis confirmed the initial Chi-square analysis. Employing procedures outlined by Beasley and Schumacker (1995), post hoc results were statistically significant and revealed that participants in the precontemplation, $\chi^2(1, N = 227) = 30.36, p < .00$, and preparation $\chi^2(1, N = 227) = 10.43, p < .00$, groups were more likely to have done something they regretted or considered embarrassing while engaging in binge drinking, while the non-binge drinker group was significantly less likely to have done something they regretted or considered embarrassing, most likely due to their lack of binge drinking activity, $\chi^2(1, N = 227) = 62.41, p < .00$. Once again, these results were expected.

Questions 44, 45, 22, and 31 directly asked about one of the rationales given explaining college student binge drinking, confronted participants with identifying whether they have a problem, and if they are aware of resources available to students. Question 44 asked participants to identify in a yes/no format if they have been warned about the negative consequences of binge drinking, and 96.9% of participants reported “yes.” Chi-square test results for Q44 were not statistically significant, $\chi^2(5, N = 226) = 4.28, p = .51$. Interpretation of the Chi-square results indicated there is no significant association between stages of change group and whether a participant had been warned

about the negative effects of binge drinking. The majority of participants, regardless of stages of change grouping, reported they had been warned about the negative effects of binge drinking.

Question 22 confronted an assumption that students use binge drinking as a common way to “blow off steam.” Over half of the participants (52%) of participants strongly agreed or agreed that binge drinking is a common way to blow off steam. Kruskal-Wallis test results comparing mean rank scores between stages of change groups in regard to Q22 were statistically significant, $\chi^2(5, N = 227) = 18.00, p < .00, \eta^2 = .08$. Post hoc analysis found only one significant comparison between the groups, non-binge drinker and precontemplation ($p < .05$). Interpretation of the results concluded that participants in the non-binge drinker group are significantly more likely to strongly disagree or disagree that binge drinking is a common way to “blow off steam” than participants in the precontemplation group.

Question 31 directly asked participants to identify yes/no if they have a problem with binge drinking. Results were highly skewed with 98.2% of the participants reporting they do not have a problem with binge drinking. Chi-square results were not statistically significant, $\chi^2(5, N = 227) = 4.57, p = .47$. The results indicated that regardless of stages of change group, a vast majority of participants feel they do not have a problem with binge drinking.

The final question regarding the health and risk of binge drinking students asked if participants were aware of counseling and other services available at their college related to alcohol use and binge drinking (Q45). Regardless of stages of change group, 88.1% of participants reported they were aware of counseling and other services available

on their campus. Chi-square test results were not statistically significant, $\chi^2(5, N = 227) = 1.86, p = .87$. Question 45 indicated that 88.1% of participants were aware of counseling and other services available at their college related to alcohol use and binge drinking, and no one stage of change group is more or less likely to be aware of such services.

Others. Three questions (21, 23, and 27) were organized for participants to rate on a Likert scale how they felt others perceived their drinking activities. For example, Q21 asked participants to rate “I am often approached by others about drinking too much at parties.” Initial results from a Kruskal-Wallis test were statistically significant, $\chi^2(5, N = 227) = 12.06, p = .034, \eta^2 = .05$, but post hoc testing failed to find statistically significant differences between any of the groups. Kurtosis and Skewness between stages of change groups was greater than ± 2.00 and in some cases as high as 5.4, violating the assumption of normality, for which the Kruskal-Wallis is usually robust. The violation of this assumption and the failure to find post hoc results indicates a strong possibility of a Type I error (finding a significant difference when one does not exist) and inability to find a difference between the stages of change groups. Question 21 indicated that 88.5% of participants strongly disagreed or disagreed that they have been approached by others about drinking too much at parties. Only nine participants strongly agreed or agreed with this statement, and post hoc testing failed to find statistically significant differences between the stages of change groups.

Question 23 asked if friends or roommates were concerned about the amount of alcohol a participant was drinking. A large majority of participants (94.2%) strongly disagreed or disagreed that friends or roommates were concerned. Only three participants strongly agreed or agreed. Similar to Q21, results from a Kruskal-Wallis test for Q23

were statistically significant, $\chi^2(5, N = 226) = 21.18, p < .00, \eta^2 = .09$. Although post hoc testing found significant results with the non-binge drinker group and maintenance group with both precontemplation ($p < .05$) and contemplation ($p < .05$), the results must be interpreted with extreme caution. Only three participants reported strongly agreeing or agreeing with Q23. Kurtosis and Skewness between stages of change groups was greater than ± 2.00 and in some cases as high as 19.00 for Kurtosis and -4.36 for skewness violating the assumption of normality which the Kruskal-Wallis is usually robust. The strong violation of this assumption indicates a high probability for falsely rejecting the null hypothesis. The recommendation for both Q21 and Q23 is to analyze results based on percentages and frequencies and discard tests of significance based on mixed analysis results and low group sizes. Results for Q21 and Q23 included 88.5% of participants strongly disagreed or disagreed that they are approached by others about drinking too much at parties and 94.2% of participants strongly disagreed or disagreed that friends or roommates were concerned about the amount of alcohol a participant was drinking.

The final question addressing the perceptions of others about binge drinking asked participants to respond on a 5-point Likert scale how strongly they believed their parents would be concerned about the number of times they binge drink in a month at college. According to the frequency distribution, 18.5% of participants strongly agreed or agreed that their parents would be concerned while 75.5% of participants strongly disagreed or disagreed that their parents would be concerned. Results from a Kruskal-Wallis test were statistically significant, $\chi^2(5, N = 226) = 21.18, p < .00, \eta^2 = .09$. Post hoc analysis found significant differences between the non-binge drinker group, maintenance, and the precontemplation ($p < .05$), contemplation ($p < .05$), and action

($p < .05$) groups. Interpretation of the analysis indicated that participants in the non-binge drinker and maintenance groups are significantly more likely to disagree that their parents would be concerned about the number of times they binge drink in a month at college than the precontemplation, contemplation, and action groups.

Summary. Statistical analyses were performed to answer *Research Question 3*, and statistically significant differences were found between the stage of change groups in regard to participant perceptions and behaviors of binge drinking. Significant differences were identified between the stages of change groups and the following constructs evaluated by the PBHRD: College Drinking, Academic Performance, College Life, Health and Risk, and Others. Results from Chi-square, Kruskal-Wallis, and post hoc Bonferroni tests were used to evaluate each of the questions to establish statistical significance and identify which stages of change groups, if any, differed significantly to questions on the PBHRD. Results from the analysis were used to answer Research Question 3: What are the differences in student perceptions and behaviors of binge drinking experiences between each stage of change? Analysis of each question of the PBHRD effectively answered Research Question 3 by finding statistically significant differences between the stages of change groups identified in this study in relationship to many of the PBRHD questions. The majority of significant findings appeared to be between the non-binge drinker/maintenance groups and the precontemplation/contemplation groups as expected. However, analysis also showed non-significant results, no difference between stages of change group, as well as a few questions that need to be interpreted with caution due to low reporting. Nevertheless, for

many of the questions, there appears to be a statistically significant difference between the stages of change group and questions on the PBHRD related to binge drinking.

Research Question 4: What are the differences between self-identified stage of change and other factors in the literature associated with identifying binge drinking students?

Stepwise multiple regression was employed to identify which factors from the PBHRD could be used to predict binge drinking students. The regression models were used to predict binge drinking episodes in the last month from the following factors: gender, intent to join a fraternity or sorority, academic performance, and other perceptions and behaviors found in the PBHRD. The regression analysis produced six statistically significant models ($p < .00$). Model 6 was statistically significant in predicting binge drinking activity in the last month, $F(6, 214) = 47.127$, $p < .00$, $R^2 = .56$, with the following factors: number of memory loss or blackout episodes, skipping class after a night of drinking, the perception that is OK to miss class after a night of drinking, embarrassing or regretful behavior when drinking, the perception it is easier to socialize after four or five drinks, and the perception that parents would be concerned with the amount of binge drinking occurring. The same regression analysis was conducted after adding one more factor—stage of change self-identification. When this factor was added, only three statistically significant models ($p < .00$) were created, the number of factors decreased, and the predictive power of the model increased as measured by R^2 . Model 3 was statistically significant in predicting binge drinking activity in the last month, $F(3, 217) = 114.833$, $p < .00$, $R^2 = .61$, with the following factors: self-identified stage of change, skipping class after a night of drinking, and perception that missing class after a night of binge drinking is OK.

A second set of stepwise multiple linear regression analyses was used to find predictive factors associated with binge drinking during the entire semester of school. The same predictor variables were used as in the previous regression models. The stepwise multiple linear regression produced six statistically significant models ($p < .00$). Model 6 was statistically significant in predicting binge drinking activity in the last semester, $F(6, 212) = 74.081$, $p < .00$, $R^2 = .67$, with the following factors: intent to join sorority or fraternity, experienced memory loss or blackout after drinking, perception it is OK to miss class after a night of drinking, perception it is easier to socialize after 4 or 5 drinks, the perception that parents would be concerned about a student's binge drinking, and the perception that drinking alcohol is a normal part of college life. The same regression analysis was conducted after adding in one more factor—stage of change self-identification. When this factor was added, five statistically significant models ($p < .00$) were created, the number of factors decreased, and the predictive power of the model increased as measured by R^2 . Model 5 was statistically significant in predicting binge drinking activity in the last month, $F(5, 213) = 152.590$, $p < .00$, $R^2 = .78$, with the following factors: stage of change self-identification (primarily precontemplation and contemplation), intent to join sorority or fraternity, experienced memory loss or blackout after drinking, perception it is OK to miss class after a night of drinking, and the perception that parents would be concerned about a student's binge drinking.

Therefore, *Question 4* was answered by using stepwise multiple linear regression to determine which factors, perceptions, and behaviors from the PBRHD would predict binge drinking behavior in the month and during the semester. Table 2 indicates the

factors that statistically significantly predicted binge drinking in both the month and semester models, and includes the stage of change models as well.

Table 2.
Predictive Factors of Binge Drinking

Factors	Regression Models			
	Month	Month + Stage of Change	Semester	Semester + Stage of Change
R ² =	0.56	0.61	0.67	0.78
Self-Identified Stage of Change		x		x
Memory Loss or Blackout Episodes	x		x	x
Skipping class night after binge drinking	x	x		
Perception it is Ok to skip class after night of binge drinking	x	x	x	x
Engaged in embarrassing or regretful behavior when drinking	x			
Perception it is easier to socialize after 4 or 5 drinks.	x		x	
Perception parents would be concerned with binge drinking behavior	x		x	x
Intent to join fraternity or sorority			x	x
Drinking alcohol is a normal part of college life			x	

Statistically significant models identified factors associated with predicting binge drinking over a month and over a semester. Some factors overlapped in the models, but predicting binge drinking at either the month or semester time frames identified factors that were not shared between the models. The only factor that was consistent in all four

models was the perception that it is OK to skip class after a night of binge drinking.

Introducing self-identified stage of change into each of the models had the same effect for both models; the number of significant factors needed to increase the predictability of the dependent variable decreased and the predictive power of each model increased. The final model, semester + stage of change, reported an adjusted $R^2 = .78$. This model, with its relevant factors, accounted for 78% of the variance in the dependent variable—the number of binge drinking episodes in a semester.

CHAPTER V

Discussion and Conclusions

The purpose of this study was to explore the application of the stages of change presented in the Transtheoretical Model of Change, a change model based on five stages of intentional change (precontemplation, contemplation, preparation, action, and maintenance) developed by Prochaska and DiClemente (1983). TTM was the underlying framework in producing a model that identified differences in freshman binge drinking perceptions and behaviors and determined whether self-identified stage of change was a significant factor in identifying binge drinking students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* institution located in the northwestern United States. The following questions guided this study:

1. What are the student demographics, in terms of numbers, gender, age-range, etc. that are self-identified in each stage of change category associated with the TTM, at a *Carnegie R2: Doctoral Universities – Higher Research Activity* institution located in the northwestern United States?
2. What are the differences in alcohol consumption among students between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the TTM, as self-reported by students at a *Carnegie R2: Doctoral Universities – Higher Research Activity* located in the northwestern United States?
3. What are the differences in student perceptions and behaviors of binge drinking experiences between each stage of change (precontemplation, contemplation, preparation, action, and maintenance) associated with the

TTM, as self-reported by students at a *Carnegie R2*: Doctoral Universities – Higher Research Activity located in the northwestern United States?

4. What are the differences between self-identified stage of change and other factors in the literature associated with identifying binge drinking students?

In Chapter IV, analysis and interpretation of the results were used to answer the four research questions listed above associated with this study. Chapter V, however, provides a brief overview of results related to the literature, limitations of the study, recommendations for the profession and future research, and an overall summary.

Discussion

In an effort to identify differences in freshman binge drinking, 227 students from a *Carnegie R2* university responded to an online survey on which they self-identified their stage of change in relationship to binge drinking and reported their perceptions and behaviors of college student binge drinking. Analysis of the results identified some areas in which this study supported previous literature and other areas where the literature was not supported. For example, in the CASA (2007) report *Wasting the Best and the Brightest: Substance Abuse at America's Colleges and Universities*, approximately 40.1% of college/university students reported binge drinking in the last month. This study, specific to one university and only the freshman class, found that 37% of the participants reported having engaged in binge drinking in the last month. While universities vary widely in their rates of binge drinking (Wechsler et al., 1994), the freshmen participants in this study appeared to align closely with the national college-student binge drinking average between 40%-45% of students nationwide regardless of

class distinction (Johnston et al., 2010a; Johnston et al., 2010b; Mundt et al., 2009; O'Malley & Johnston, 2002; White & Swartzwelder, 2009).

Related to college student binge drinking rates, this study asked participants to identify if they thought drinking alcohol and if binge drinking were “normal” parts of college life. This question usually asks participants to report on the level of binge drinking they think is occurring on a college campus. This study determined that the non-binge drinking and maintenance groups were significantly less likely than the other groups to conclude that drinking was a “normal” part of college life and that the majority of participants (55%) disagreed or strongly disagreed that binge drinking was a normal part of college life. It is interesting to note that the only statistically significant comparison associated with the perception that binge drinking is a “normal” part of college life occurred between non-binge drinkers (participants who report never binge drinking) and precontemplation (participants who report actively binge drinking). This study also found that 73% of the participants had the perception that students on campus drink to get drunk. Once again the precontemplation group was more likely to report this statement as true compared to the non-binge drinker and action groups. While a small majority disagreed that binge drinking was a normal part of college life, it was perceived that those who do drink do so to extremes to get drunk.

In regard to gender, this study found that 40% of the male participants had engaged in binge drinking in the past month compared to 34% of the female participants. This finding is again in line with the conclusion that generally more male students engage in binge drinking than do female students (CASA, 2007; Center for Disease

Control and Prevention, 1997; CORE, 2010; CORE, 2005; Hingson et al., 2005; Johnston et al., 2010b; O'Malley & Johnston, 2002; Wechsler, Lee, Kuo et al., 2002).

This study did not report binge drinking rates based on race/ethnicity because of low reporting and lack of diversity within the sample. Therefore, it is unclear whether race/ethnicity differences were a significant factor in identifying significant differences in binge drinking rates for this sample. However, other studies have noted differences in race/ethnicity in regard to binge drinking rates most often reporting White male students engaging in binge drinking significantly more often than their peers (CASA, 2007; Center for Disease Control and Prevention, 1997; CORE, 2010; Hingson et al., 2005; O'Malley & Johnston, 2002; Wechsler, Lee, Kuo et al., 2002). Similarly, other areas of the demographics from this study (i.e. age, resident, relationship status) were not reported due to lack of diversity in the sample regarding these characteristics.

This study reported a significant difference in academic performance based on stages of change group. Participants in the non-binge drinker group were significantly more likely to have a higher GPA than participants in the precontemplation group, as measured by self-reported GPA. These results are in line with other studies measuring the effects of alcohol consumption on academic performance (Maney, 1990; Musgrave-Marquart, 1997; Wechsler and Nelson, 2008; Williams et al., 2003). However, this research also asked participants if they perceived binge drinking students performing the same academically as other students at school. Compared by stages of change groups, participants in the precontemplation group were statistically significantly more likely to perceive academic parity with the non-binge drinker group but report a lower GPA. This disparity between academic perception and performance according to stages of change

group provides an impetus for further research in how social norms campaigns present the relationship between academics and college student binge drinking. The results of this study, however, clearly show that precontemplation students (students most likely to engage in binge drinking) performed lower academically than their non-binge drinking peers.

Another component of college student drinking is retention rates of students. This study, although recognizing the mixed results in the research related to college student drinking and retention (DeBerard et al., 2004; Martinez et al., 2008; Wechsler and Nelson, 2008), did not address student retention. The study was not developed to contact or identify students who were no longer attending the university. However, participants in the maintenance and non-binge drinker groups were more likely than their peers in the precontemplation group to strongly agree or agree that binge drinking students are more likely to drop out of school.

Regarding class attendance, the precontemplation group was more likely to agree or strongly agree that it is OK to participate in binge drinking during the week as long as a student does not miss class. It is interesting to note that 58.2% of participants, regardless of stages of change group, agreed or strongly agreed that it is common for students to skip class after a night of binge drinking. Powell et al. (2002), drawing from the 1997 and 1999 CAS studies in regard to undergraduate students, stated: "Number of drinks consumed per drinking occasion does not significantly affect getting behind in school and only weakly affects the probability of skipping class" (p. 14). In contrast, the CASA (2007) study of undergraduate students reported that over half of binge drinking students reported either missing classes (68.1%) or falling behind in their school work

(50.6%). This study supported research that found that students perceive that skipping class occurs after a night of binge drinking. The precontemplation group was statistically significantly more likely to skip class after a night of binge drinking than was the non-binge drinker group, but participants from this study overwhelmingly reported having never skipped class after a night of binge drinking. Once again, this brings into question the difference between a perceived behavior and a reported behavior. It is necessary to note that other factors including the type of class and when a class is offered in students' schedules may affect how participants answered this question.

Research has supported an association between binge drinking and Greek life (CASA, 2007; McCabe et al., 2005; Wechsler & Nelson, 2008). This study reported that 64.8% of the participants did not intend to join a fraternity or sorority; however, there was a significant relationship between stages of change group and intent to join a fraternity or sorority. Participants in the precontemplation group were significantly more likely to intend to join a fraternity or sorority. The non-binge drinkers were the least likely to intend to join a fraternity or sorority. Stages of change group had no significant effect on the perception that high risk drinking is the norm at fraternity and sorority parties on campus, but 64% of participants strongly agreed or agreed that binge drinking is the norm at fraternity or sorority parties on campus and 68% of participants strongly agreed or agreed that most college students plan to engage in high risk drinking when they attend fraternity or sorority parties. Wechsler and Nelson (2008) reported that "membership in a fraternity or sorority" was associated with freshman undergraduate student binge drinking and that "students living off campus away from their parents and students living in fraternity or sorority houses had the highest rates of binge drinking"

(pp. 4-5). Student housing was not significant for this study, since 89% of participants reported living on campus. This study, however, confirmed the perception that Greek life is associated with college student binge drinking, and students attend fraternity and sorority parties to get drunk. One shortfall of this study, however, is that the survey only addressed on-campus functions and did not ask about off-campus fraternity and sorority activities. The addition of distinguishing between on and off-campus Greek life events would have provided valuable information for Greek life administrators in distinguishing whether binge drinking is occurring more frequently in on or off-campus events.

This study, in order to fill gaps in the literature, posed questions to expand understanding of participant perceptions related to the social aspect of binge drinking. For example, participants in the precontemplation group were significantly more likely to agree that binge drinkers have more fun at parties than do their non-binge drinker and maintenance peers. Participants from the precontemplation, contemplation, and action groups were significantly more likely than other groups to agree that it is easier to socialize with peers after 4 or 5 drinks. This study also found that the precontemplation and contemplation groups were more likely to agree that they spend time during the week trying to find which weekend party will have the easiest access to alcohol.

Several studies have been conducted noting the health and risk factors associated with college student drinking. For this study, questions focused primarily on personal health and safety, legal problems, the actions of others, and mental health. This research concluded that there is a statistically significant positive relationship with the precontemplation group and being a passenger in a car when the driver has been binge drinking. Hingson et al. (2005) reported that as the number of students engaged in binge

drinking increased, so did the number of students driving under the influence of alcohol. The sample reported 11% of the participants in this study had been passengers in cars where the drivers had been binge drinking. However, there was no association between stages of change group and having been arrested, spent time in jail, received an alcohol citation, or a DUI/DWI charge due to binge drinking behavior. Participant reports regarding legal troubles need to be highly scrutinized in this study due to the small number of participants reporting legal problems. Also, it is important to note that this study was conducted in April, near the end of the traditional fall/spring academic calendar, and it is possible that students who had been arrested or received legal infractions due to binge drinking may no longer have been attending the university.

Sexual assault and other forms of unwanted sexual behavior are often associated with college student drinking. CASA's (1999) report on substance abuse and sex explained that 46 to 75 percent of date rapes and sexual assaults experienced by college students involved alcohol; according to Johnston et al. (2001), this amounted to approximately 97,000 students. This study concluded that unwanted sexual advances from a person who is or has been binge drinking were neither more nor less likely to occur to participants, according to stage of change group; 19.4% of participants reported unwanted sexual advances from a peer who was binge drinking. This percentage was lower than the 25% sexual assault or completed rape rate reported by Krebs et al. (2007). The Krebs et al. (2007) study reported that of the 19% of female students and 6.1% male students experiencing sexual assault or completed rape, reported alcohol was a major factor in a majority of reported incidents. Comparison to other research is important, but must be made with caution because the definition of sexual assault/rape may be

interpreted differently by respondents. However, in regard to this study, victims of unwanted sexual advances were represented in all of the stages of change groups, and no one group was more or less likely to experience unwanted sexual advances. However, previous research is clear that students who engage in binge drinking are more likely to be a victim of a crime.

Students' personal health and safety are major concerns for colleges and universities. Zakletskaia (2012), surveying identified high-risk alcohol-using students, found that over half of the students sampled experienced at least one or more black-outs in a twelve-month period. Mundt and Zakletskaia (2012) calculated that "at a university of 40,000 students, with 25 percent of students experiencing blackouts, yearly emergency department costs due to blackouts would range from \$469,000 using national data..." (para. 46). This current study concluded that 71.4% of the sample reported knowing a student who had passed out from binge drinking with no significant difference found between the stages of change groups. This study found that 30.8% of participants had experienced a blackout or memory loss from binge drinking. The precontemplation group was significantly more likely to experience this negative effect compared to other groups. The results for this study found that the rate of blackouts and memory loss more closely resembles the results found by Mundt and Zakletskaia (2012).

Closely related to blackouts and memory loss are emergency room visits. In their study, Mundt and Zakletskaia (2012) determined that 12.8% of emergency room visits by their sample were due to blackout drinking. This study found that 48.9% of the sample knew another student who had been taken to the hospital for too much drinking. There was no significant difference between the stages of change groups. However, only 1.3%

of participants reported having been taken to the hospital due to binge drinking behavior. Although the blackout/memory loss episodes are similar to Mundt and Zakletskaia (2012), the number of hospital visits reported for this study was lower than Mundt and Zakletskaia (2012). The lower hospital visit report for this study may be because students taken to the hospital for problems related to binge drinking were no longer at the university, chose not fill out the surveys, or students were not taken to the hospital during a blackout episode.

Wechsler et al. (1994) and Hingson et al. (2005) both studied the negative effects of college student drinking on students who binge drink and students who do not drink. Analysis of results from this study concluded that 67.8% of participants had cared for a peer who had been binge drinking. The precontemplation group was significantly more likely to have cared for a friend who had been binge drinking compared to the other stage of change groups as expected, and the non-binge drinking group was statistically significantly least likely to care for a friend. Over 35% of participants reported that they had embarrassed themselves or done something they regretted when binge drinking. The precontemplation and action groups were significantly more likely to agree they had done so. The non-binge drinking group had a significant inverse relationship, as expected, and was least likely to have embarrassed themselves or have done something they regretted. Reporting having to care for a peer and embarrassing oneself as a result of binge drinking have been found true in previous research (Hingson et al., 2005; Wechsler et al., 1994). White et al. (2002) found that approximately half of students reporting experiencing a blackout also reported finding out they had engaged in at least one of the negative consequences associated with binge drinking.

A few questions from this study were concerned with the rationale participants gave for engaging in binge drinking, if they understood the dangers of binge drinking, and if they knew of counseling resources available to students on campus. Participants in the precontemplation group were significantly more likely to strongly agree or agree that binge drinking is a common way to “blow off steam.” The 1994 CASA report suggested that students drink to “have fun,” which is usually associated with attempts at “alleviating boredom, stress, anxiety and pressure created by academic demands; reducing social sexual inhibitions; and simply blowing off steam” (p. 28). A vast majority of participants (98.2%) felt they did not have a problem with binge drinking. This result is not surprising when taking into account that a major characteristic of precontemplators is a denial that there is a problem. Also, 88.1% of participants responded that they knew of counseling services available on their campus. Stages of change grouping was not a significant factor in recognizing a problem with binge drinking or knowledge of available counseling services.

Another area of research focus not addressed in the literature involved understanding participants and how they considered others to perceive their drinking activities. Participants were asked if they had been approached by others about drinking too much and if their friends or roommates were concerned about how much they were drinking. Unfortunately, responses showed little to no variation between the stages of change groups and the results were suspect. Although this may be an area of future research and of interest to social norms researchers, this study was unable to find significant differences between the stages of change groups and the results were suspect of a type 1 error. However, the majority of students reported they had not been

approached by others about their drinking habits and that friends/roommates were not concerned about the amount of alcohol they were consuming.

One question asked participants to identify the concern of their parents in relation to the amount of alcohol they were drinking. Participants in the precontemplation, contemplation, and action groups were significantly more likely to perceive that their parents would be concerned about the number of times they binge drink in a month at college. Perceived parent perception was also a significant factor in a majority of the regression models from this study aimed at identifying binge drinking students. Ichiyama et al. (2009) reported that parents have an influence on college student drinking rates, but more research needs to be conducted in this area. Future research is needed to determine more clearly if family of origin, parental drinking patterns, and/or the presence or lack of a culture of binge drinking within a student's family have significant effects on a student's binge drinking perceptions and behaviors at college.

Other areas of the literature were not addressed in this research either due to not fitting the scope or purpose of this research or due to lack of diversity in the sample. For example, there has been research linking the effects of college student drinking on personality traits and student mental health (Courtney & Polich, 2009; Mallett, Bachrach, & Turrisi, 2008; Quinn, Stappenbeck, & Fromme, 2011; White et al., 2002; Weitzman, 2004). However, this research did not assess personality traits or mental health issues regarding college student binge drinking. Although this is a very interesting aspect of the literature, for the scope of this study this particular area of binge drinking research was not addressed. There were also areas of the literature that this research did not answer due to low reporting or lack of variation in the sample. These areas included assessing

demographic and stages of change differences by race/ethnicity, relationship status, and on/off campus housing. The homogeneity in the sample did not allow for accurate analysis in the aforementioned groups.

The last area of the literature that was not directly addressed in this study involved interventions used by the research site to prevent binge drinking, or to educate the student population about the risks or harms of binge drinking. The purpose of this study was to understand perceptions and behaviors, and not to compare prevention strategies. There are several studies mentioned in the literature review focusing on strategies being incorporated on college and university campuses (CASA, 1994, 2007; Cimini et al., 2009; DeJong & Langford, 2002; Ichiyama et al., 2009; Larimer & Cronce, 2007; Moore et al., 2013; Prochaska et al., 2004; Scribner et al., 2011; Tomey & Wagenaar, 2007; Wechsler, Lee, Kuo et al., 2002; Weitzman, & Nelson, 2004; Wood et al., 2009). Application of the instruments from this study may be useful in future research to match strategies incorporated by colleges and universities that fit individual or groups of students according to their TTM stages of change group, perceptions, and behaviors of binge drinking. Prochaska et al. (2004) concluded the following: “By applying TTM principles and resources that can be inclusive for people at each stage and each level, interventions of alcohol abuse can maximize participation at each level which can maximize impacts across the organization” (p. 47).

Regression analyses were run to identify significant factors associated with predicting binge drinking over a month and semester timeframes. Four significant models along with their significant factors were reported. Some factors overlapped in the models, but predicting binge drinking at either the month or semester time frames identified

factors that were not shared between the models. Predictive factors associated with the month timeframe included the following: number of memory loss or blackout episodes, skipping class after a night of drinking, the perception that it is OK to miss class after a night of drinking, embarrassing or regretful behavior when drinking, the perception it is easier to socialize after four or five drinks, and the perception that parents would be concerned with the amount of binge drinking occurring. Predictive factors associated with the semester timeframe included the following: intent to join sorority or fraternity, experienced memory loss or blackout after drinking, perception it is OK to miss class after a night of drinking, perception it is easier to socialize after 4 or 5 drinks, the perception that parents would be concerned about a student's binge drinking, and the perception that drinking alcohol is a normal part of college life. The only factor that was consistent in all four models was the perception that it is OK to skip class after a night of binge drinking. All of these factors have been used in past research. However, introducing self-identified stage of change into each of the models increased the predictability power of each model and reduced the number of significant factors needed to make a prediction of binge drinking episodes. The final model, semester + stage of change, reported an adjusted $R^2 = .78$. This model, with its relevant factors, accounted for 78% of the variance in the dependent variable—the number of binge drinking episodes in a semester. In other words this final model can be used as a screening instrument to identify students (7.8 out of 10, or with a 78% likelihood) who are likely to engage in binge drinking during the semester.

Limitations and Future Research

Several areas of limitation or concern arise in college student binge drinking research. This study was no exception. For example, from the population sample of 1541, the response rate was only 14.7 % (n = 227). Johnston et al. (2010b) identified the difficulties of getting a large enough population and a high response rate as one of the main hurdles in college alcohol research. The low response rate, while adequate to provide a summary for this research site, is not adequate to generalize to other settings. Therefore, generalizability to other colleges and universities must be done with extreme caution. Along with the low response rate is the fact that the sample itself showed little diversity in regard to race/ethnicity, housing situation, and relationship status. The lack of diversity within the sample provides another drawback to generalizability and makes the results of this study relevant to only its setting. The low response rate and lack of sample diversity are two other factors reported by Johnston et al. (2010b) as major roadblocks to generalizability of this type of research.

There are several recommendations for future research that may help increase the response rate and diversity of the sample. For example, the ideal situation would be to obtain funding for a multi-site study. Future researchers may also employ strategies including offering incentives, employing more enticing marketing strategies to garner student interest in the study, and working with study sites to include the survey instruments as part of pre-established drug and alcohol curriculum/assessments.

Another debated topic related to college student binge drinking research is the use of self-report measures. DiClemente et al. (2004) related that self-report measures in this type of research often produce setting specific data. This study employed self-report

measures in the form of a staging algorithm and the PBRHD survey instrument. Dufour (1999) concluded that self-report measurement has its limitations in the use of alcohol research due to the fact that the research relies on the honesty of respondents. One aspect of addictions research is that those who have a problem are often in denial of that problem. An example of this denial may have been with Q31 of the PBHRD. The sample ($n = 227$) was highly skewed with 98.2% of the participants reporting that they did not have a problem with binge drinking, and the results showed no significant difference between the stages of change groups. Wechsler et al. (1994) claimed “few students describe themselves as having a drinking problem” (p. 1676). However, Lintonen et al. (2004) stated, “Survey self-reports are, and will likely continue to be, the most widely used method of obtaining alcohol use data...” (p. 368). Despite self-report limitations, this method of data gathering was appropriate for this research study, but future research may be able to employ more than one data gathering method in a single study to avoid some of the limitations of self-reporting.

Another criticism of the survey instruments used in this study that will need to be addressed in the future is related to how questions are worded. This study addressed sensitive personal topics primarily or secondarily related to binge drinking. For instance, in this study, ed topics related to binge drinking, underage drinking, unwanted sexual advances, hospital visits, legal issues, personal behaviors, and other health and safety topics. Participants may have felt uncomfortable answering some of these questions and failed to complete the surveys. One solution for this problem is to re-word the PBHRD questions so that participants are answering questions in regard to the perceptions and behaviors of their “best friend” or their close “group of friends.” This strategy may help

participants feel more comfortable answering questions and significantly increase response rates. While the PBHRD employs this strategy for some questions, it does not use this strategy for all of its questions. Another strategy is to allow participants to skip questions or simply reply Not Applicable (NA). For this study, questionnaires were not accepted if there was more than one incomplete question, and an NA option was not available.

There are other factors that may have affected the reporting of binge drinking rates by participants. For example, this study did not take into account other forms of measurement like blood alcohol content (BAC) or the effects of an individual's size and weight. The PBHRD asked participants to report how many times during a month and semester a student had engaged in binge drinking, but did not specify which days during the week participants were most likely to engage in binge drinking behavior. This information would have added to the identification of student binge drinking patterns and could have helped identify if student work and class schedules impact binge drinking behavior.

As noted in the literature, several criticisms of the stages of change and staging algorithms exist. One specific criticism acknowledged by DiClemente et al. (2004) is that it is difficult to identify where one stage begins and where one ends. Sutton (2001) declared that because of a lack of uniformity in stage definitions, there at times may be no difference between stages. Herzog (2008) reported that, according to his evaluation, TTM and its major constructs do not meet the criteria put forth in the assessment model and that the stages of change do not represent separate and distinct categories. Although the purpose of this study was not to assess the validity of the stages of change as separate

and distinct constructs, it is interesting to note where significant differences were and were not found between the stages. For example, it was expected that the vast majority of significant differences would be found between the precontemplation and contemplation groups compared to the non-binge drinker and maintenance groups. This conclusion simply reflects the majority of the significant relationships because these groups represent the extremes in self-reported binge drinking behavior among the respondents as well as the largest number of respondents. The non-existence of significant differences between the preparation (preparing to make a change) and action (starting to act toward change) groups with each other and with the other stages of change groups can be attributed to one or two major factors: 1) small group sample size and lack of respondents in these two groups and 2) there may not be a significant difference between the preparation and action groups in their perceptions and behaviors related to college student binge drinking. Further research is necessary to assess whether the preparation and action stages are distinctly separate constructs or whether preparing to make changes might be the beginning of action.

The PBHRD or Alcohol: Stages of Change Short Form can be used in future research if limitations identified in this study are addressed. The greatest problem associated with this research and identified by other researchers is the difficulty in gathering a sample large enough and diversified enough to generalize findings of a study to campuses across the nation. However, this type of study is time intensive, expensive, and will require the cooperation of students and administrators nationwide. Another area of further study would include comparing the PBHRD and the Alcohol: Stages of Change Short Form to other instruments used by colleges and universities to identify students

engaging in at-risk or binge drinking behaviors. Many campuses employ online educational or assessment tools for students to educate them about the dangers of binge drinking. However, one of the main tenants of the Transtheoretical Model of Change is to match interventions to stage of change identification. Prochaska and Velicer (1997) stated: “We believe that the future of health promotion programs lies with stage-matched, proactive and interactive interventions” (p. 176). Weitzman and Nelson related that “we need to become more sophisticated in crafting and targeting prevention efforts so that the field moves away from the misconception that ‘one size fits all’ when designing prevention programs” (p. 262). Finally, this study also concluded and agrees with previous research that future research will continue to be difficult due to the multi-variable concepts associated with college student binge drinking (Hingson, 2005; Wechsler & Nelson, 2008). Interpretation of the regression analysis from this study concluded that no one factor predicts participants’ perceptions and behaviors associated with college student binge drinking. Further research will continue to uncover associations related to this topic as researchers use several factors associated with binge drinking or focus on a single variable and its effects.

The time of year this study was conducted may have influenced the results. This study was conducted between March and April 2016. Students who may have left school prior to data collection and possibly due to the negative effects of binge drinking would not have been identified nor had the chance to participate in this study.

One of the results of this study confirmed the perception that binge drinking is an expectation of joining a fraternity or sorority. Fraternity and sorority recruitment at this university was conducted in the fall and spring semesters. Spring recruitment was held in

February, about a month before this study was conducted. Therefore, it is unknown if the perceived relationship between binge drinking and Greek life for this sample was a preconceived belief or influenced by recruiting activities in the fall or spring. Conducting this research at the beginning of the fall semester before recruitment events may give a clearer picture of the relationship between binge drinking expectations and Greek life in the view of incoming freshmen college students. Nevertheless, Baer's (2002) statement, although brief, generally summarizes the relationship between Greek life and binge drinking: "Membership in Greek social organizations and social activities in large groups were associated with increased drinking" (p. 49).

The majority of participants intending to join fraternities and sororities were from the precontemplation and contemplation groups. Recommendations for student affairs professionals, administrators, and Greek life advisors include 1) stage matching interventions focused on providing relevant facts/information regarding the effects and risks of binge drinking; 2) prominently posting or advertising Greek life policies on alcohol use at sponsored functions; 3) providing information on the number of "dry" Greek life sponsored activities; 4) using motivating language in written and posted materials associated with an alcohol-free Greek life and activities; and 5) conducting social norms campaigns that not only point out the negative effects of college student binge drinking, but highlight positive resources, activities, and influences (Treatment Improvement Protocol, 1999).

Another recommendation is to tap into the influence of parents of incoming students. Educating parents and encouraging them to talk to their students on the dangers of binge drinking may have a significant effect on a student's decision to engage in binge

drinking behavior. Three of the four regression models included in this study for predicting binge drinking students identified parent concern as one of the significant factors. Ichiyama et al. (2009) concluded that although further research is needed, parent involvement can have an effect on student drinking. More research is needed to identify the effect that the family of origin has on promoting or discouraging college student binge drinking. Future research topics related to family of origin and college student binge drinking could include identifying significant factors related to a student's socio-economic status, parental alcohol use, and parents' reported stage of change related to binge drinking, and the relationship between college student binge drinking perceptions and behaviors of first generational or immigrant students.

An important area of further research associated with this study is stage of change identification and the effect it may have on identifying a model that can predict binge drinking. The addition of stage of change identification into the regression models employed by this study showed an increase in adjusted R^2 for both the month (.56 to .61) and the semester models (.67 to .78). The semester + stage of change model ($R^2 = .78$), in particular, accounted for 78% of the variance in the dependent variable (how many times this semester has the student engaged in binge drinking). Future research would be needed to see if this rate of predictability can be replicated and applied to other samples. Further study would also be needed to see if this rate of predictability is comparable or significantly different from other instruments in use to identify students at high risk for binge drinking behavior. If replicable, the semester + stage of change model could provide university, college officials, and student affairs professionals with a five-question instrument that identifies binge drinking students with 78% accuracy. In other words, the

semester + stage of change model may predict or identify almost 8 out of 10 binge drinking students. Combined with other screening instruments, this model could be very beneficial as a screening tool in identifying students at high risk of binge drinking behavior.

Currently, many colleges and universities discuss with incoming students during the orientation process the topic of high risk or binge drinking. These efforts are often conducted through online tutorials and social norms campaigns. It may be valuable in future research to provide the staging algorithm with the semester + stage of change regression model as a pre-test to incoming freshmen and later as a post-test in order to evaluate the impact of other intervention efforts currently used by a college or university.

Nevertheless, a simple screening instrument is not the answer to the problem of college student binge drinking. As suggested by DeJong and Langford (2002), a social-ecological model of prevention implementing individual, group, institutional, community, and state/federal policies may include several screening instruments as one part of a multi-pronged approach in addressing this multi-faceted problem. Longitudinal research is needed to determine the long-term effectiveness of social-ecological approaches.

Summary

In conclusion, this study found that for this sample of students, there are significant differences between the stages of change for some perceptions and behaviors related to freshman college student binge drinking; for other factors, there were no significant differences. Significant differences between the stages of change were found in relation to the following perceptions and behaviors: 1) binge drinking is a normal part of college life; 2) students drink to get drunk; 3) academic performance and GPA;

4) student retention; 5) class attendance; 6) intent to join a fraternity or sorority; 7) it is easier to socialize and have fun at parties; 8) time spent seeking parties with alcohol; 9) riding in a car with a binge drinker; 10) experiencing blackouts/memory loss; 11) caring for a peer who has been binge drinking; 12) embarrassed themselves or done something they regretted when binge drinking; 13) binge drinking as a stress management technique; and 14) the perception that parents would be worried about students' binge drinking behavior.

This study found no significant difference in perceptions and behaviors between the stages of change in the following areas: 1) binge drinking as the norm at fraternity or sorority parties; 2) on or off campus student-housing situation; 3) legal issues; 4) unwanted sexual advances; 5) knowing another student who had passed out from too much drinking; 6) knowing another student who had been taken to the hospital; 7) recognizing a personal problem with binge drinking; 8) knowledge of counseling services available; 9) the perception of others on a student's binge drinking behavior; 10) race/ethnicity; and 11) on or off campus housing situation. Although there was no significant difference between the stages of change groups for these last 11 areas, the non-significant results need to be interpreted with caution. Some of the non-significant results were due to a homogenous sample and a general consensus of a large majority of the sample regardless of stages of change group.

The regression analysis identified four significant models in predicting binge drinking episodes in the month and semester time frames. The final model, semester + stage of change, reported the highest power (78%) in predicting binge drinking episodes in a semester with the following significant factors: stage of change self-identification,

intent to join sorority or fraternity, experienced memory loss or blackout after drinking, perception it is OK to miss class after a night of drinking, and the perception that parents would be concerned about a student's binge drinking.

Other areas of concern and research suggestions were provided to further guide college student binge drinking research. Nevertheless, this study identified significant differences between the stages of change groups and many perceptions and behaviors related to college student binge drinking, as well as identified factors for this sample relevant in predicting binge drinking behavior. Further research will be able to identify whether the semester + stage of change model can be applied to other college and university settings and provide a means for administrators, counselors, and student affairs officials to identify students at high risk for binge drinking behavior.

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APPENDIX A

Informed Consent – Pilot Study

PILOT STUDY: INFORMED CONSENT

**Idaho State University and [REDACTED]
Human Subjects Committee/[REDACTED]
Informed Consent Form for Non-Medical Research**

CONSENT TO PARTICIPATE IN RESEARCH

APPLICATION OF THE STAGES OF CHANGE IN EXPLORING FRESHMAN COLLEGE STUDENT PERCEPTIONS AND BEHAVIORS OF BINGE DRINKING

My name is Jared Tonks, and I am a doctoral candidate in the Education Leadership Program at Idaho State University. I am asking you to participate in a pilot study that completes requirements for the degree of Doctor of Education concentrating in Higher Education Administration. I ask you to participate in this pilot study because of your standing as a freshman or sophomore college student. Approximately 40 of your peers will be asked to participate in this pilot study. Your participation in this study is voluntary. Please read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate (my email address is tonkjare@isu.edu).

Purpose of Study

The purpose of this pilot study is to evaluate the validity and consistency of the Perceptions and Behaviors of High Risk Drinking (PBHRD) questionnaire I developed in preparation for research exploring freshman college student perceptions and behaviors of high risk drinking.

If you volunteer to participate in this study, this is what you can expect:

1. You will receive one online survey instrument utilizing Survey Monkey. Responses will be secured and encrypted using SSL/TSL connections. IP Blocking and Email Blocking will be in place ensuring that individual response are anonymous and not directly linked to personal email or IP addresses.
2. The *Perceptions and Behaviors of High Risk Drinking (PBHRD)* questionnaire, that I developed, will ask questions about your perceptions of high risk drinking, and will take approximately 10 minutes to complete.
3. Completion of the PBHRD questionnaire ends your participation in this pilot study.

1. POTENTIAL RISKS AND DISCOMFORTS

Risks associated with receiving emails or completing the survey instrument addressing underage drinking are more than minimal. There may be questions that could make you

sad or upset, or a chance that another peer may learn you participated in this study. It is not foreseeable that there are any physiological, psychological, social, legal, or financial risks associated with this study. However, as with all studies, the research procedures may involve risks that are currently unforeseeable.

2. ANTICIPATED BENEFITS TO SUBJECTS

You should not expect to benefit directly from participation in this research.

3. ANTICIPATED BENEFITS TO SOCIETY

Results from this pilot study will be used to confirm the validity and reliability of the PBHRD for further use in my dissertation study. The study will add to the body of knowledge related to college student drinking, specifically high risk drinking.

4. PRIVACY AND CONFIDENTIALITY

Unless you inform another person or contact the researcher with questions, your participation in the study will be confidential. No information about you, or provided by you during the research, will be disclosed to others without your written permission, except (a) if necessary to protect our rights or welfare (for example, if you are injured), or (b) if required by law.

When the results of the research are published or discussed in conferences or at dissertation defense, no information will be included that would reveal your identity. Data will be password protected and kept secure by the researcher at the researcher's residence in a secure locked cabinet. There will be no direct link between your responses and your email address either because the Registrar's Office facilitated the emails requesting your participation and the researcher did not have access to your email address; or, the researcher deleted all email addresses at the completion of the study. Survey Monkey's IP Blocking and Email Blocking will be in place ensuring that individual response are anonymous and not directly linked to personal email or IP addresses.

5. PARTICIPATION AND WITHDRAWAL

Your participation in this study is VOLUNTARY. If at any time and for any reason during this study you wish to discontinue, you may do so by exiting from the surveys or deleting emails related to this study. You have the right to refuse participation in this research study. There are no penalties associated with refusing to participate in this study.

6. WITHDRAWAL OF PARTICIPATION BY THE INVESTIGATOR

The investigator may withdraw you from participating in the research if any of the following apply:

- You are under 18 years of age.

- You are not considered to be a freshman and/or sophomore college student.

- You do not answer survey instruments to completion.

7. IDENTIFICATION OF INVESTIGATORS

In the event of a research related injury or if you experience an adverse reaction, please immediately contact one of the investigators listed below. If you have any questions about the research, please contact Jared Tonks at tonkjare@isu.edu, [Dr. Alan Frantz at franalan@isu.edu](#), or [REDACTED].

8. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have any questions regarding your rights as a research subject, you may contact the Human Subjects Committee office at 282-2179 or by writing to the Human Subjects Committee at Idaho State University, Mail Stop 8130, Pocatello, ID 83209. [REDACTED]

I have read (or someone has read to me) the information provided above. I have been given an opportunity to ask questions, and all of my questions have been answered to my satisfaction. This email serves as the informed consent form and your participation implies informed consent.

BY CLICKING ON THE LINK BELOW, I WILLINGLY AGREE TO PARTICIPATE IN THE RESEARCH DESCRIBED IN THIS EMAIL, WITH THE KNOWLEDGE THAT I AM FREE TO WITHDRAW MY PARTICIPATION AT ANY TIME WITHOUT PENALTY.

APPENDIX B

Informed Consent

STUDY: INFORMED CONSENT

Idaho State University and [REDACTED] Human Subjects Committee/[REDACTED] Informed Consent Form for Non-Medical Research

CONSENT TO PARTICIPATE IN RESEARCH

APPLICATION OF THE STAGES OF CHANGE IN EXPLORING FRESHMAN COLLEGE STUDENT PERCEPTIONS OF BINGE DRINKING

My name is Jared Tonks, and I am a doctoral candidate in the Education Leadership Program at Idaho State University. I am asking you to participate in a research study that completes requirements for the degree of Doctor of Education concentrating in Higher Education Administration. I ask you to participate in this research because of your standing as a freshman or sophomore college student. Approximately 1,400 of your peers will be asked to participate in this study. Your participation in this research project is voluntary. Please read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate (my email address is tonkjare@isu.edu).

Purpose of Study

Using concepts from the Transtheoretical Model of Change, a personal change theory, the purpose of this study is to explore differences in freshman perceptions and behaviors of high risk drinking.

If you volunteer to participate in this study, this is what you can expect:

1. You will receive a SurveyMonkey link to two online surveys
Responses will be secured and encrypted using SSL/TSL connections.
IP Blocking and Email Blocking will be in place ensuring that individual response are anonymous and not directly linked to personal email or IP addresses.
2. The first survey instrument, *Alcohol Stages of Change: Short Form and Demographics*, will be used to identify your personal stage of change (precontemplation, contemplation, preparation, action, maintenance, or non-binge or high risk drinker). The survey and associated demographic questions can be completed in less than 10 minutes.
3. *Perceptions and Behaviors of High Risk Drinking (PBHRD)*. The second survey instrument is a questionnaire I have developed. This questionnaire will ask about your perceptions and behaviors of high risk drinking, and will take approximately 10 minutes to complete.
4. Completion of the PBHRD questionnaire ends your participation in this study.

1. POTENTIAL RISKS AND DISCOMFORTS

Risks associated with receiving emails or completing the survey instrument addressing underage drinking are more than minimal. There may be questions that could make you sad or upset, or a chance that another peer may learn you participated in this study. It is not foreseeable that there are any physiological, psychological, social, legal, or financial risks associated with this study. However, as with all studies, the research procedures may involve risks that are currently unforeseeable.

2. ANTICIPATED BENEFITS TO SUBJECTS

You should not expect to benefit directly from participation in this research.

3. ANTICIPATED BENEFITS TO SOCIETY

This study will add to the body of knowledge related to college student drinking, specifically high risk drinking. Results gathered in this study will be used as part of a dissertation defense and conference presentations.

4. PRIVACY AND CONFIDENTIALITY

Unless you inform another person or contact the researcher with questions, your participation in the study will be confidential. No information about you, or provided by you during the research, will be disclosed to others without your written permission, except (a) if necessary to protect our rights or welfare (for example, if you are injured), or (b) if required by law.

When the results of the research are published or discussed in conferences or at dissertation defense, no information will be included that would reveal your identity. Data will be password protected and kept secure by the researcher at the researcher's residence in a secure locked cabinet. There will be no direct link between your responses and your email address either because the Registrar's Office facilitated the emails requesting your participation and the researcher did not have access to your email address; or, the researcher deleted all email addresses at the completion of the study. Survey Monkey's IP Blocking and Email Blocking will be in place ensuring that individual response are anonymous and not directly linked to personal email or IP addresses.

5. PARTICIPATION AND WITHDRAWAL

Your participation in this study is VOLUNTARY. If at any time and for any reason during this study you wish to discontinue, you may do so by exiting from the surveys or deleting emails related to this study. You have the right to refuse participation in this research study. There are no penalties associated with refusing to participate in this study.

6. WITHDRAWAL OF PARTICIPATION BY THE INVESTIGATOR

The investigator may withdraw you from participating in the research if any of the following apply:

You are under 18 years of age.

You are not considered to be a freshman and/or sophomore college student.
You do not answer survey instruments to completion.

7. IDENTIFICATION OF INVESTIGATORS

In the event of a research related injury or if you experience an adverse reaction, please immediately contact one of the investigators listed below. If you have any questions about the research, please contact Jared Tonks at tonkjare@isu.edu, Dr. Alan Frantz at franalan@isu.edu, or [REDACTED]

8. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have any questions regarding your rights as a research subject, you may contact the Human Subjects Committee office at 282-2179 or by writing to the Human Subjects Committee at Idaho State University, Mail Stop 8130, Pocatello, ID 83209. [REDACTED]

I have read (or someone has read to me) the information provided above. I have been given an opportunity to ask questions, and all of my questions have been answered to my satisfaction. This email serves as the informed consent form and your participation implies informed consent.

BY CLICKING ON THE LINK BELOW, I WILLINGLY AGREE TO PARTICIPATE IN THE RESEARCH DESCRIBED IN THIS EMAIL, WITH THE KNOWLEDGE THAT I AM FREE TO WITHDRAW MY PARTICIPATION AT ANY TIME WITHOUT PENALTY.

APPENDIX C

Alcohol: Stages of Change (Short Form) & Demographics

Alcohol: Stages of Change (Short Form)

Alcohol Stage Item for non-dependent drinkers

Males = 5 or more drinks in a row; Females = 4 or more drinks in a row

Please mark only one of the following. In the last month have you had 5 (male) or 4 (female) or more drinks in a row?

1. Yes, and I do not intend to stop drinking 5 (4) or more drinks in a row. ☐
2. Yes, but I intend to stop drinking 5 (4) or more drinks in a row during the next 6 months. ☐
3. Yes, but I intend to stop drinking 5 (4) or more drinks in a row during the next 30 days. ☐
4. No, but I have had 5 (4) or more drinks in a row in the past 6 months. ☐
5. No, and I have not had 5 (4) or more drinks in a row in the past 6 months. ☐
6. No, I have never had 5 (4) or more drinks in a row. ☐

Demographics

1. **Gender:** (M) (F)
2. **Age:** (18-20) (21-23) (24+)
3. **Race/Ethnicity:** (Asian American) (African American) (Hispanic American)
(American Indian) (Native Hawaii) (Multi-Race) (Unknown)
(White/Caucasian)
4. **Student Status:** (Full-Time) (Part-Time)
5. **Relationship Status:** (Single, never married) (Married or Domestic Partnership)
(Divorced) (Widowed) (Separated)
6. **Residence:** (On-Campus Housing) (Off Campus Housing)
7. **Do you plan on pledging for a Fraternity or Sorority your first year of college?**
(Yes) (No)

APPENDIX D

CPRC Permission to Use Alcohol: Stages of Change (Short Form)



Cancer Prevention Research Center Measures

- [About CPRC](#)
[Faculty, Staff
& Students](#)
[Resources &
Environment](#)
[Survey Center](#)
[Job](#)
[Opportunities](#)
[Contact CPRC](#)

- [Transtheoretical
Model](#)
- [Publications](#)
- [Measures](#)

"CPRC - A research organization dedicated to helping people change their behavior for living longer, healthier lives"

■ Here you can find the psychological measures that have been developed at the CPRC. All measures are copyright Cancer Prevention Research Center, 1991. Dr. James O. Prochaska, Director of the CPRC, is pleased to extend his permission for you to use the Transtheoretical Model-based measures available on this website for research purposes only, provided that the appropriate citation is referenced.

Please Note: All assessment inventories are available for research purposes only and are not for clinical use.

- [Smoking](#)
- [Alcohol](#)
- [Cocaine](#)
- [Mammography](#)
- [Exercise](#)
- [Sun Protection](#)
- [Coping & Stress](#)
- [Weight Control](#)
- [Psychotherapy](#)
- [HIV & Safer Sex](#)
- [Substance Abuse](#)
- [URICA](#)
- [Other](#)

APPENDIX E

Dr. Robert Laforge: Permission to Use Alcohol: Stages of Change (Short Form)

From: Robert Laforge <rlaforge@uri.edu>
Sent: Thursday, October 21, 2010 5:01 PM
To: Jared Tonks
Subject: FW: Health behavioural model
Attachments: Stage validity and reliability explanation.doc

Dear Jared,

The ‘short form’ is a staging algorithm for frequency of high risk drinking. It is not used for identifying alcohol dependence. Attached is a document that describes some of the issues related stage of change measure with respect to validity and reliability. Because the stage measure is an algorithm, not a scale, the issue of reliability does not involve internal inter-item consistency, but rather replication in cross sectional studies, and/or predictive validity in longitudinal studies. For the stage measure you are interested in we have demonstrated both construct validity in numerous cross-sectional samples -- i.e. measures of alcohol use and alcohol problems decrease as you look across the groups ordered from PC to Maintenance. I have also shown in two longitudinal studies that stage has predictive validity, that is stage of change predicts drinking behavior and alcohol related problems in a manner consistent with the cross-sectional results. The two longitudinal studies have not been published yet, but will soon be submitted. (if you want to cite the longitudinal results, please give me a call before you do, depending upon what precisely you are referring to, it may be fine to cite this unpublished work as personal correspondence from me I hope this helps.

You are free to use any measures on the CPRC website for research purposes.

Bob

Robert Laforge, Sc.D.
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APPENDIX F

Perceptions and Behaviors of High Risk Drinking (PBHRD) Pilot Study

Perceptions and Behaviors of High Risk Drinking (PBHRD)
(Online Survey)

Please respond to how much you agree or disagree with the following statements based on your experience since the beginning of the academic school year. The term *High Risk Drinking* will refer to “a pattern of drinking alcohol that brings blood alcohol concentration (BAC) to 0.08gram percent or above. For the typical adult, this pattern corresponds to consuming 5 or more alcoholic drinks in a row (for males) and 4 or more alcoholic drinks in a row (for females), in about two hours” (NIAAA, 2004).

1. Drinking alcohol is a normal part of college life.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
2. High risk drinking is a normal part of college life.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
3. Most students drink to get drunk.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
4. It is common for students to skip class after a night of high risk drinking.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
5. Students who regularly engage in high risk drinking perform the same academically as students who do not.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
6. Students who engage in high risk drinking are more likely to drop out of school.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
7. I find it easier to socialize with other students after 4 or 5 drinks.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
8. High risk drinking is the norm at fraternity and sorority parties on my campus.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
9. I spend time during the week trying to figure out which weekend party will have the most and easiest access to alcohol.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
- ~~10. High risk drinking is a problem on most college campuses.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)~~

(This question is asked differently in question 2. Removing this question increased α from .733 to .806. The determination was made to eliminate this question for the final study.)

11. Most college students plan to engage in high risk drinking when they attend fraternity or sorority parties.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
12. I am often approached by others about drinking too much at parties.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
13. High risk drinking is a common way to “blow off steam” and relieve stress at college on the weekends.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
14. My friends and/or roommates are concerned about the amount of alcohol I drink.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
15. It is ok to participate in high risk drinking during the week as long as you do not miss class.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
- ~~16. The definition for high risk drinking [5 or more alcoholic drinks (for males) and 4 or more alcoholic drinks (for females) in a row in about two hours] is not accurate. The amounts are too low and should be increased to more accurately reflect what it means to engage in high risk drinking.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)~~
(This question was removed after running a Cronbach’s Alpha. Statistically, α increased from .56 to .733 with the removal of this item. This item, while the investigator thinks it is interesting, it does not really fit the constructs of perceptions and behaviors of high risk drinking being measured by the Likert scale questions. This item was deleted from the final survey.)
17. High risk drinkers seem to have more fun at parties and social gatherings.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
18. High risk drinking happens on campus more often than professors or school administrators think.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
19. My parents would be concerned about the number of times I high risk drink in a month at college.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)

Please respond to the following:

20. Estimate what percentage of students on your campus drink alcohol.
(10%) (20%) (30%) (40%) (50%) (60%) (70%) (80%) (90%) (100%)
21. Estimate what percentage of students on campus drink 5 or more alcoholic drinks (for males) or 4 or more alcoholic drinks (for females) in a row at least 2 times a month.
(10%) (20%) (30%) (40%) (50%) (60%) (70%) (80%) (90%) (100%)
22. How many times a month do you drink 5 or more alcoholic drinks (for males) or, 4 or more alcoholic drinks (for females) drinks in a row?
(0) (1-2) (3-4) (5-6) (7-8) (9-10) (more than 10)
23. Do you believe you have a problem with high risk drinking?
(Yes) (No)
24. My current academic performance would most likely reflect the following GPA:
(3.5--4.0) (3.0--3.49) (2.5--2.99) (2.0--2.49) (below 2.0)

Please respond to the following statements and questions based on your experiences at college since the beginning of the academic school year.

25. I have been a passenger in a car when the driver has been high risk drinking.
(Yes) (No)
26. I have experienced unwanted sexual advances from another person who is or has been high risk drinking.
(Yes) (No)
27. How often this semester have you had 5 for more alcoholic drinks (for males) or 4 or more alcoholic drinks (for females) drinks in a row?
(0) (1-2) (3-4) (5-6) (7-8) (9-10) (more than 10)
28. How often have you experienced memory loss (blackout) after high risk drinking?
(0) (1-2) (3-4) (5-6) (7-8) (9-10) (more than 10)
29. I know a student who “passed out” from drinking too much.
(Yes) (No)
30. Have you been arrested, spent time in jail, received an alcohol citation, or received a DUI/DWI?
(Yes) (No)

31. I have embarrassed myself or done something I regret while engaging in high risk drinking.
(Yes) (No)
32. I have skipped class following a night of high risk drinking.
(Yes) (No)
33. I know a student who was taken to the hospital for “drinking too much.”
(Yes) (No)
34. I have visited or been taken to a hospital emergency room or urgent care facility because of my drinking.
(Yes) (No)
35. I have cared for a friend who participated in high risk drinking the night before.
(Yes) (No)
36. I have been warned about the negative effects of high risk drinking.
(Yes) (No)
37. I am aware of counseling and other services available at my college specifically related to heavy alcohol use or high risk drinking.
(Yes) (No)

APPENDIX G

Perceptions and Behaviors of High Risk Drinking (PBHRD) Study

Perceptions and Behaviors of High Risk Drinking (PBHRD)
(Online Survey)

Please respond to how much you agree or disagree with the following statements based on your experience since the beginning of the academic school year. The term *High Risk Drinking* will refer to “a pattern of drinking alcohol that brings blood alcohol concentration (BAC) to 0.08gram percent or above. For the typical adult, this pattern corresponds to consuming 5 or more alcoholic drinks in a row (for males) and 4 or more alcoholic drinks in a row (for females), in about two hours” (NIAAA, 2004).

1. Drinking alcohol is a normal part of college life.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
2. High risk drinking is a normal part of college life.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
3. Most students drink to get drunk.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
4. It is common for students to skip class after a night of high risk drinking.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
5. Students who regularly engage in high risk drinking perform the same academically as students who do not.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
6. Students who engage in high risk drinking are more likely to drop out of school.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
7. I find it easier to socialize with other students after 4 or 5 drinks.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
8. High risk drinking is the norm at fraternity and sorority parties on my campus.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
9. I spend time during the week trying to figure out which weekend party will have the most and easiest access to alcohol.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
10. Most college students plan to engage in high risk drinking when they attend fraternity or sorority parties.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
11. I am often approached by others about drinking too much at parties.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)

12. High risk drinking is a common way to “blow off steam” and relieve stress at college on the weekends.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
13. My friends and/or roommates are concerned about the amount of alcohol I drink.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
14. It is ok to participate in high risk drinking during the week as long as you do not miss class.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
15. High risk drinkers seem to have more fun at parties and social gatherings.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
16. High risk drinking happens on campus more often than professors or school administrators think.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)
17. My parents would be concerned about the number of times I high risk drink in a month at college.
(Strongly Agree) (Agree) (No Opinion) (Disagree) (Strongly Disagree)

Please respond to the following:

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19. Estimate what percentage of students on campus drink 5 or more alcoholic drinks (for males) or 4 or more alcoholic drinks (for females) in a row at least 2 times a month.
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(0) (1-2) (3-4) (5-6) (7-8) (9-10) (more than 10)
21. Do you believe you have a problem with high risk drinking?
(Yes) (No)
22. My current academic performance would most likely reflect the following GPA:
(3.5--4.0) (3.0--3.49) (2.5--2.99) (2.0--2.49) (below 2.0)

Please respond to the following statements and questions based on your experiences at college since the beginning of the academic school year.

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(Yes) (No)
24. I have experienced unwanted sexual advances from another person who is or has been high risk drinking.
(Yes) (No)
25. How often this semester have you had 5 for more alcoholic drinks (for males) or 4 or more alcoholic drinks (for females) drinks in a row?
(1) (1-2) (3-4) (5-6) (7-8) (9-10) (more than 10)
26. How often have you experienced memory loss (blackout) after high risk drinking?
(1) (1-2) (3-4) (5-6) (7-8) (9-10) (more than 10)
27. I know a student who “passed out” from drinking too much.
(Yes) (No)
28. Have you been arrested, spent time in jail, received an alcohol citation, or received a DUI/DWI?
(Yes) (No)
29. I have embarrassed myself or done something I regret while engaging in high risk drinking.
(Yes) (No)
30. I have skipped class following a night of high risk drinking.
(Yes) (No)
31. I know a student who was taken to the hospital for “drinking too much.”
(Yes) (No)
32. I have visited or been taken to a hospital emergency room or urgent care facility because of my drinking.
(Yes) (No)
33. I have cared for a friend who participated in high risk drinking the night before.
(Yes) (No)
34. I have been warned about the negative effects of high risk drinking.
(Yes) (No)
35. I am aware of counseling and other services available at my college specifically related to heavy alcohol use or high risk drinking.
(Yes) (No)