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**EXPLORING RELATIONSHIPS AMONG FRIENDSHIPS, SOCIAL STATUS, AND PROBLEM  
DRINKING IN COLLEGE STUDENTS: A SOCIAL NETWORK ANALYSIS**

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## ABSTRACT

Previous research has demonstrated that students' peer groups have a powerful influence on individual alcohol use. Some specific findings include that students tend to overestimate their peers' drinking and approval of drinking behaviors, and that students will consume more to match these inflated perceptions (Borsari & Carey, 2001, 2003; Perkins & Craig, 2012). Previous research on social networks has also found that alcohol use is associated with increased popularity or status (Ennett et al., 2006; Moody et al., 2011; Reifman et al., 2006). Relatively few studies have addressed the ways in which one's closest peers can have a positive influence. Behavioral interventions that rely on positive peer influence have shown promising evidence in other arenas (Banyard et al., 2007; Hays et al., 2003).

In order to better understand whether peer influence can be leveraged to reduce dangerous drinking and resultant harms, this study investigated three specific questions: (1) Can students recognize problem drinkers in their networks? (2) How do different measures of status correlate to drinking behaviors? and (3) What is the relationship between status and willingness to intervene or express disapproval for drinking behaviors? The present study employed methods of social network analysis to investigate these questions quantitatively. 200 participants from 8 fraternities and sororities completed a survey instrument that assessed individual alcohol behaviors and perceptions, and asked participants to nominate specific peers as: friends, someone who is fun to be around in a party/drinking setting, someone they look up to or admire, problem drinkers, and non-problem drinkers.

Self-reported alcohol consequences was the strongest predictor variable for problem drinker nominations, suggesting that students perceive problem drinkers in their social networks with some level of accuracy. With regard to status it was found that while drinks per week and self-reported alcohol consequences showed some overall positive associations with friendship and status, both had nonlinear relationships with friendship nominations, and association actually becomes negative at higher levels. This suggests that more extreme or problematic alcohol behaviors actually have a social cost. Participants also completed a scale of items assessing their willingness to intervene helpfully with a peer whose drinking may be causing harm to self or others. Higher scores on this scale were predicted by self-reported use of harm reduction strategies (like deciding to limit drinking to a certain number of drinks) and having held a leadership position.

These findings suggest that (1) students can recognize problem drinking in their peers, (2) that drinking, especially problematic drinking, is not socially rewarded unconditionally and can be negatively related to friendship and status, and (3) that students who hold leadership positions in their organizations and students who use protective behavioral strategies while drinking are more likely to helpfully intervene

with friends. These findings suggest some promising ways forward for interventions that aim to engage students as part of the solution.

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## **GLOSSARY OF ACRONYMS**

BAC	Blood Alcohol Content
CAS	College Alcohol Study (Harvard)
DRSE	Drinking Refusal Self Efficacy
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR
HED	Heavy Episodic Drinking
NIAAA	National Association of Alcohol Abuse and Alcoholism
SLT	Social Learning Theory
SNA	Social Network Analysis
DDQ	Daily Drinking Questionnaire
B-YAACQ	Brief Young Adult Alcohol Consequences Questionnaire
DNRF	Drinking Norms Rating Form
HAQ	House Acceptability Questionnaire
PBS	Protective Behavioral Strategies
PBSS	Protective Behavioral Strategy Survey
PBSM	Protective Behavioral Strategy Measure
SQ	Strategies Questionnaire

## **Chapter 1**

### **Introduction**

Colleges and universities in the United States have had to deal with student alcohol consumption virtually since their inception. As early as 1734 Harvard instated a rule that prohibited students from consuming distilled spirits and brandy (Straus & Bacon, 1953). Today over 80% of college students drink alcohol and a national sample of college presidents ranked excessive drinking as the number one campus-life problem (O'Malley & Johnston, 2002; Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism, 2002). College student alcohol use results in over 1700 deaths per year, along with numerous other problems including injuries, property damage, and academic consequences (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Perkins, 2002b).

Colleges and Universities have employed many different intervention strategies to reduce the harm caused by alcohol on their campuses. To date, only indicated interventions (those that target only students known to be problem drinkers) have shown consistent evidence of effectiveness. However, because those indicated students represent a small proportion of the overall population, the vast majority of alcohol-related problems are experienced by students who fall outside this group (Weitzman & Nelson, 2004). Unfortunately, universal interventions (those that target all students) have met with mixed results of effectiveness (Dejong, Larimer, Wood, & Hartman, 2009; Wechsler et al., 2003). One culprit that is often blamed for these more widespread and entrenched problem behaviors is a “culture” among students that promotes unsafe drinking (Lederman & Stewart, 2005; National Institute of Alcohol Abuse and Alcoholism, 2002). Indeed research on the way in which college student drinkers are influenced by their peers has consistently found that (1) the more an individual socializes with peers that drink heavily, the more likely it is that that individual will also exhibit heavy drinking behavior, (2) that students consistently overestimate the degree to which their peers drink and the degree to which their peers

approve of heavy drinking behaviors, and (3) that popularity (social network centrality) has a positive relationship to drinking (Borsari & Carey, 2003; Ennett et al., 2006; Moody, Brynildsen, Osgood, Feinberg, & Gest, 2011; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Perkins, 2002a; Reifman, Watson, & McCourt, 2006).

One interpretation of these findings is that students are either blind to the problems caused by drinking in themselves and their peers and that heavier drinking behaviors are socially rewarded. However, there is evidence that students disapprove of certain drinking behaviors, including use that negatively impacts others and drinking that results in loss of self-control (Caboni et al., 2005; Demant & Järvinen, 2011; Lederman & Stewart, 2005). This study attempts to understand more fully the social dynamics that affect college student alcohol use by addressing the primary research question:

What are the relationships among drinking behaviors, social relationships, and status within a social network?

Methods of social network analysis allow for a more thorough examination of students' friendships and social status because the researcher has data from all network members. For example, it is possible that students who occupy a more influential position within a network (those that are popular or well-liked) behave differently with regard to drinking and adhering to group norms than students with more uncertain social positions.

The specific sub-questions addressed by the present study include:

1. How do students recognize problem drinkers in their networks?
2. How do different measures of status correlate to drinking behaviors?
3. What is the relationship between status and willingness to intervene or express disapproval for drinking behaviors?

This study hypothesizes that students recognize problem drinkers in their immediate social networks and disapprove of extreme drinking behaviors (i.e. losing control, use that results in significant

consequences for the user or others), but that students' relative social status affects their willingness to express disapproval or intervene.

If students recognize and disapprove of problematic drinking behaviors, this could represent a profound change in the understanding of peer norms around alcohol and could have important implications for intervention. Though students' misperception of peer drinking norms is well established, group interventions that attempt to reduce drinking by correcting these misperceptions (social norms campaigns) have met with mixed results (Borsari & Carey, 2003; Wechsler et al., 2003). These programs usually present normative information about the "typical student" to correct misperceptions. Some researchers suggest that these more distal comparison groups may be less effective than using a reference group more proximal to students (i.e. their close friends), because students don't aspire to be the "typical student" and it may be difficult for students to conceptualize such an abstraction (Barnett, Far, Mauss, & Miller, 1996; Polonec, Major, & Atwood, 2006; Wechsler & Wuethrich, 2002). This study investigates whether some peers are more influential than others (based on friendships or other status indicators, such as being named as "fun to drink with"). A more comprehensive understanding of how students may experience these phenomena differently could potentially help social norms interventions be more effective.

The present study could also inform the use of "peer opinion leader" or "bystander intervention" programs, two possibly under-utilized approaches when it comes to college drinking. Peer opinion leader interventions typically identify influential individuals within a community and target them to receive and help disseminate the intervention (Valente and Pumpuang, 2007). The advantage is that rather than trying to reach a community in its entirety, or selecting a subset at random for intervention, the resources are going toward those that have the greatest likelihood of influencing the entire group. This approach has shown evidence of efficacy in interventions that aim to promote safe sex behaviors, interventions that teach safe injection practices for intravenous drug users, and diffusion of medical innovations (Hays, Rebchook, & Kegeles, 2003; Kelly, 2005; Soumerai et al., 1998; Valente, 2012). By examining which

peers in a social network are the most influential with regard to drinking behaviors, the present study could be an important step in developing peer opinion leader interventions that target college student drinking.

Bystander intervention programs use a slightly different social mechanism. These programs, instead of targeting the perpetrators or victims of dangerous behaviors, attempt to reduce the socially undesirable behavior by encouraging bystanders who witness problematic behaviors to intervene. The intervention seeks to instill salient social norms against the behavior and portrays standing idly by as tacit approval. This approach has shown promise in programs that attempt to reduce sexual assault on college campuses (Banyard, Moynihan, & Plante, 2007; Foubert, Langhinrichsen-Rohling, Brasfield, & Hill, 2010). A clearer understanding of whether or not students disapprove of certain drinking behaviors and what variables affect students' willingness to express that disapproval or intervene could provide groundwork for the development of a bystander intervention program that targets alcohol use.

Methods of social network analysis (SNA) are particularly suited to these questions. SNA focuses not on individual attributes, but on relationships between actors in a group (Valente, 2010). The method is especially apt for investigating questions of social position and status. If one were to assume some individual attribute were a marker of central social position (e.g. having a leadership position in a student organization), that may capture only a small portion of influential students, or it may miss the mark altogether as having a leadership position may not indicate an important social position with regard to the behaviors being studied. However by using SNA, a researcher can collect data directly from participants and determine each person's relative influence based on who is named as a "friend" by the most people, or who is nominated by their peers as a leader or someone from whom people seek advice (Valente & Pumpuang, 2007). Additionally network data allows for a compelling investigation of whether or not students perceive problematic behaviors in close friends by comparing peer nominations to self-report alcohol use and consequences.

The present study focuses on Greek organizations (fraternities and sororities). Greek organizations tend to have an overrepresentation of high risk drinkers and have been shown to respond differently from other social groups to certain types of intervention (Borsari, Hustad, & Capone, 2009; Carey, Scott-Sheldon, & Carey, 2007; Ham & Hope, 2003). As such, they represent a particular “at-risk” population among college students. Additionally a Greek organization represents a readily identifiable network with clear boundaries, thereby making it easy to determine who is in and out. Within these organizations it is also reasonable to expect that members know the majority of other members and interact regularly. In short Greek organizations provide ideal conditions for social network analysis.

College student drinking is a serious problem and advances in effective interventions are needed to help institutions reduce the resulting harm. Though there is much research that suggests peer influence is a powerful factor in students’ decisions around drinking, many questions about the complexity of this process remain unanswered and interventions have yet to make use of analogous research information in a beneficial way. This study addresses gaps in the current literature by employing social network analysis methods and by examining various measures of social status, the extent to which students disapprove of extreme drinking behaviors within their immediate social networks, and variables that might influence willingness to express that disapproval.

## **Chapter 2**

### **Literature Review**

#### **Consequences**

Alcohol consumption can and does result in significant damage to self, others, and institution. There are around 1700 alcohol-related college student deaths each year (Hingson, Heeren, Winter, & Wechsler, 2005). Two large, national samples of college students provide perhaps the most generalizable data in this area: the CORE Alcohol and Drug Survey (Presley, Meilman, Cashin, & Lyster, 1996) and the Harvard College Alcohol Study (CAS) (Wechsler, Dowdall, Lee, Gledhill-Hoyt, & Maenner, 1998) (for a review of these and other studies of consequences see: Perkins, 2002b). These studies report some of the following consequences resulting from alcohol use (all within the past year): between 22-26% of students suffer a memory loss or “blackout”, 9-13% suffer a personal injury, 40% report at least one hangover, and 47% report nausea or vomiting (Presley et al., 1996; Wechsler et al., 1998). Around one-third of students report driving under the influence of alcohol and 5-12% report trouble with police or campus authorities (Presley et al., 1996; Wechsler et al., 1998).

Students also suffer academic consequences from alcohol use, with 22% indicating they performed poorly on a test or project, 28% missed a class, and 19% reporting falling behind in schoolwork because of drinking. GPA is also significantly and negatively related to frequent heavy drinking (Pascarella et al., 2007).

Alcohol use also increases risky sexual behaviors. According to the CAS, 18% of students reported engaging in unplanned sexual activity, and 9% reported not using protection because of alcohol use (Wechsler et al., 1998). The CORE survey found that 12% of females and 11% of males reported

having been taken advantage of sexually as a result of drinking or drug use (Presley et al., 1996). Other studies have found that over 25% of college women have been the victim of sexual assault, attempted sexual assault, sexual abuse, battery, intimidation, or illegal restraint, and that over half were at least somewhat drunk at the time (Frintner & Robinson, 1993; Harrington & Leitenberg, 1994).

Alcohol-related harm affects others beyond the individual drinker. 8% of students report damaging property, 30% of students report being in a fight or argument as a result of drinking or drug use (Presley et al., 1996; Wechsler et al., 1998). As a result of another student's drinking, 13% of students report being pushed, hit, or assaulted, 22% were involved in a serious quarrel, 27% were insulted or humiliated, 43% experienced interruptions in sleep or study time, and 44% had to "babysit" another student who drank too much (Wechsler, Moeykens, Davenport, Castillo, & Hansen, 1995). Significant damage can also be inflicted on the institution itself in the form of higher attrition rates and lost tuition, added time and stress on college personnel, strains in town/gown relations, and damage to a school's reputation for academic rigor (Perkins, 2002a).

### **Understanding Prevalence/Defining Problem Drinking**

Epidemiological questions can be best examined using a number of large national datasets (including the Harvard College Alcohol Study, the CORE Institute Alcohol and Drug Survey, the Monitoring the Future project, and the National College Health Risk Behavior Survey. A comparison reveals a great deal of consistency among them (O'Malley & Johnston, 2002). These studies all report that over 80% of students consume alcohol in any given year, with just under 70% reporting 30-day prevalence, and the longitudinal studies indicate these figures have remained relatively stable over time (O'Malley & Johnston, 2002).

The majority of students have experience with alcohol before entering the college environment (Abar & Maggs, 2010; Miller & Nirenberg, 1984). Additionally, the highest rates of alcohol use and



greatest percentage of problem drinkers occur within the age range of 18-24 (Dimeff, Baer, Kivlahan, & Marlatt, 1999). Taken together, these two findings raise the question of whether the college environment has a particular impact on alcohol use, or if high rates of drinking (and problems related to drinking) are simply a factor of the age of most traditional college students. Several studies that have examined this question using longitudinal research and other methods have relatively consistent results. These studies have found that in high school, college-bound students drink less than their non-college bound counterparts but then surpass their non-college peers after matriculating (Ham & Hope, 2003; O'Malley & Johnston, 2002; Timberlake et al., 2007). This suggests quite convincingly that some aspect of the college environment seems to be conducive to excessive alcohol use. However, longitudinal studies that attempt to understand the long-term implications of drinking in college consistently show that the vast majority of students who exhibit problematic drinking behaviors in college mature out of these behaviors and do not develop long term alcohol problems (Schulenberg et al., 2001; Sher, Bartholow, & Nanda, 2001).

Even though the majority of students do not develop long term issues, excessive alcohol use among students is a very real and ubiquitous problem for colleges and universities. However, defining this problem poses a challenge in itself. Though data collection issues like defining what is considered “1 drink” have mostly been resolved (12 grams alcohol- the equivalent of 12 oz. standard beer, 5 oz. wine, or 1.5 oz. 80 proof liquor) (Dufour, 1999), defining what constitutes “problem drinking” is more complex. Measures of frequency and quantity are certainly informative, however the DSM-IV criteria for alcohol abuse and alcohol dependence use markers like “significant impairment or distress,” legal problems, failure to fulfill obligations, or unsuccessful attempts at cutting down/stopping (American Psychiatric Association, 2000). Even in this clinical diagnostic tool, one can see a conception of problem drinking that includes consequences or problems related to alcohol use, rather than measures of quantity/frequency alone. The research on college drinking is no different. Many studies measure both use and problems resulting from use, with understanding that as use increases, the likelihood of problems does as well. The

goal in measuring both constructs is to delineate problem drinking from moderate (or non-problem) drinking (Dimeff, Baer, Kivlahan, & Marlatt, 1999).

### **Institutional Response**

Institutions have a long history of dealing with alcohol and its relationship to general student unruliness. In earlier times schools relied mostly on restrictive rules to regulate out-of-class behavior, with things like enforced curfews, along with prohibitions against alcohol, card-playing, and profanity (Horowitz, 1987). However many academics point the Dixon vs. Alabama State Board of Education decision that effectively ended in loco parentis as triggering a shift in institutions' relationship to student behavior, including alcohol use (Bowden, 2007; Cruise, 2009; Lewis & Thombs, 2005). That decision in 1961, along with the change in the age of majority from 21 to 18 in 1971, meant that schools no longer had complete parental authority over students and were now legal custodians in a contractual capacity, where students' rights to due process and notification of regulations became more important (Bowden, 2007; Cruise, 2009). Some argue that these developments ushered in a "bystander era" during the 60s and 70s in which institutions absolved themselves of responsibility for students' out of class behavior, and any resultant dangers. This period has been subsequently followed by a "duty of care" era marked by a de jure and de facto institutional responsibility to protect students from foreseeable harm (Bowden, 2007; Cruise, 2009). Additionally, the 1989 "Drug-Free Schools and Communities Act" mandated that all schools receiving federal funds notify students of rules, risks, consequences, available treatment, and set minimum standards for addressing drug and alcohol issues (Bowden, 2007).

This era of increased responsibility demanded a new type of response because the restrictive policies of in loco parentis were no longer possible. Institutions of higher education began instead to employ a prevention/intervention approach based mostly on harm reduction. Many forces contributed to the shaping of this new approach. Schools began addressing issues like substance use and sexual activity

and new research began to recognize college student drinking as a unique problem which required a response beyond the “disease model” of alcoholism (Correia, Murphy, & Barnett, 2012; Dowdall, 2008; Turner & Hurley, 2002). The concept of “harm reduction” became popular in the United States during the 1980s with programs like needle exchanges to prevent the spread of HIV through intravenous drug use. It is defined often by differentiating it from abstinence approaches. Harm reduction takes a pragmatic stance that seeks to reduce the harm resulting from certain high-risk behaviors, rather than attempting to eliminate such behaviors, with the goal of maximizing quality of life (Marlatt, Larimer, & Witkiewitz, 2011). So rather than enforcing dormitory curfews and strict alcohol prohibitions, most institutions employ a multi-pronged strategy that includes notifying students of policies limiting alcohol availability and use, educating about alcohol, providing social alternatives, and offering educational or counseling interventions for students that may be problem drinkers (Dowdall, 2008).

Perhaps the most recent paradigm shift in higher education when it comes to alcohol is a recent focus on employing evidence-based strategies. Through the last few decades, many colleges and universities employed these various harm reduction and interventions strategies, without a thorough understanding of what works, or even the underlying mechanisms that influence college student choices around alcohol use (Dowdall, 2008). Notable increases in grants from various sources and multiple long-running research projects focusing on the subject of college student drinking helped to address this lack of empirical support for current intervention practices (Wechsler & Isaac, 1991), but perhaps none more influential than two special publications by the National Institute for Alcohol Abuse and Alcoholism (NIAAA) (Dejong et al., 2009; National Institute of Alcohol Abuse and Alcoholism, 2002). These two volumes present a systemic research effort that organizes various types of interventions according to evidence of efficacy.

The first of these two volumes (appropriately titled “A Call to Action: Changing the Culture of Drinking at U.S. Colleges”), demonstrates several important points about the current state of research and practice when it comes to addressing college student alcohol use. First, the report comes from a harm

reduction/health perspective, by emphasizing the problems associated with drinking (particularly health consequences) and advocating strategies above and beyond policy enforcement and consequences.

Second, it takes an ecological perspective of the problem, declaring that: “Foremost among their recommendations is that to achieve a change in culture, schools must intervene at three levels: at the individual-student level, at the level of the entire student body, and at the community level” (p. 2). Third, the report emphasizes that more research is needed- both in examining intervention efficacy and in understanding the underlying mechanisms that influence student drinking.

In 2009 the NIAAA released the results of its “Rapid Response to College Drinking Problems Initiative,” which organized common intervention strategies into various tiers based on known evidence of efficacy ” (Dejong et al., 2009). The first tier, “evidence of effectiveness among college students,” includes programs that intervene with identified problem drinkers, mostly on an individual basis. Tiers 2 and 3 contain strategies that have shown some promise, but that have yet to produce compelling evidence of effectiveness with college students. The prominent strategies in these tiers fall into two categories, environmental management policies and social norms campaigns. Tier 4 describes programs with “evidence of ineffectiveness,” saying that:

Basic awareness and education programs, although a major part of prevention work on most college campuses, fell into this tier. Typical among these efforts are orientation sessions for new students; alcohol awareness weeks and other special events; and curriculum infusion, wherein instructors introduce alcohol-related facts and issues into their regular academic courses (Dejong et al., 2009, p. 6).

These tier 4 strategies represent a sort of direct education approach that was prevalent among the earlier harm reduction strategies on college campuses (Dowdall, 2008). The logic model that underlies these approaches assumes that educating students about alcohol and the consequences that can result from use will result in less dangerous drinking among students. As the NIAAA 2009 report confirms, this model ignores a host of important factors. In one study, perceptions of risk had no significant correlation with student drinking measures, while other factors (like normative beliefs) showed significant correlations (Lewis & Thombs, 2005). Though some current interventions with solid evidence of efficacy

have educational components, interventions based on education alone consistently have been shown to be ineffective (Correia et al., 2012; Miller & Nirenberg, 1984; Perkins, 2002a).

Among strategies for which there is mixed evidence, social norms campaigns deal with correcting student misperceptions of how much their peers are drinking or engaging in other risky behaviors. In a review of the abundant research in this area, Perkins (2002b) found “student peer norms to be the strongest influence on students' personal drinking behavior... [and that] prevalence among students of dramatic misperceptions of peer norms regarding drinking attitudes and behaviors is also a consistent finding” (p. 164). Given the fact that normative beliefs consistently predict dangerous drinking and that normative feedback is a major part of effective interventions (tier 1, described below), it is somewhat puzzling that this intervention strategy does not have more empirical support. One explanation is that the delivery mechanism for these programs (mainly poster and other media marketing campaigns) is ineffective. Other explanations include that students do not believe the statistics meant to correct normative perceptions and that the reference group often used (“typical student”) does not have meaning for students (Borsari & Carey, 2003; Polonec et al., 2006; Thombs, Dotterer, Olds, Sharp, & Raub, 2004; Wechsler & Wuethrich, 2002).

The other mixed-evidence strategy in the NIAAA report is environmental management. Environmental management refers to policies that aim to reduce alcohol availability and that are also concerned with “deemphasizing the role of alcohol and creating positive expectations on campus” (Toomey, Lenk, & Wagenaar, 2007, p. 208). Specific policy changes include: increasing enforcement of alcohol outlets checking identification, banning beer kegs on campus, reducing the density of alcohol establishments, and increasing the price of alcohol in the immediate campus area (Toomey et al., 2007). Some environmental management interventions have shown promising results using a comprehensive approach that includes many of the aforementioned policy changes (Saltz, 2011). Though evidence is mixed, it is important to recognize the promise of targeting the environment or culture, because intervening with students individually may not always be feasible.

The interventions that have shown the most promising evidence of efficacy (tier 1) are all programs that intervene with identified problem drinkers, known as “indicated interventions.” These programs intervene with individual students and utilize a motivational interviewing framework. Some factors that these exemplary programs have in common are: “building motivation to change drinking; changing the drinker’s expectancies about alcohol’s effects; clarifying norms through feedback on the drinker’s alcohol use in comparison with other students; providing cognitive-behavioral skills training, including how to monitor daily alcohol consumption and stress management; and developing a tailored plan for reducing alcohol use” (Dejong et al., 2009, p. 5).

However, these targeted individual interventions are resource-intensive for institutions. Additionally, student alcohol use is particularly difficult to tackle from a public health or prevention standpoint because the majority of the harm is experienced by those who cannot be screened into a “high-risk” subset (Weitzman & Nelson, 2004). This is known as the “prevention paradox,” in which a relatively small subset of the population meet the screening criteria, and the total “cost” is born more heavily across the much larger “low-risk” group. This phenomenon points to the importance of moving beyond indicated and individual interventions if we wish to have an impact on the harms resultant from alcohol use in college students.

The present study aims to address gaps in current research that could support the development of more effective universal interventions. First, misperceptions of peer norms powerfully influence student drinking, yet universal interventions that attempt to correct these misperceptions such as social norms campaigns have shown inconsistent results. It is hypothesized that by examining every individual within a somewhat bounded social network like a fraternity or sorority, we might better understand how students’ perceptions of peer norms with respect to a salient and proximal reference group compare to the actual behaviors of that group.

This study could help illuminate the role of social influence as it occurs within college social networks with regard to drinking. For example, if the heaviest drinkers occupy central/influential

positions in their social networks, that would suggest a positive, linear relationship between heavy drinking and status/centrality. It is possible though, that instead the heaviest drinkers are more peripheral or low-status, while more moderate drinkers are central. This information could also be instrumental in identifying opinion leaders.

### **Ecological Model**

The present study draws on more than one theoretical perspective in understanding human behavior. First, it draws on an ecological model. This perspective in understanding behavior was first popularized by Urie Bronfenbrenner (1979) and is based on the principles that (1) specific behaviors have multiple influences (including intrapersonal, interpersonal, community, and public policy), (2) that these influences interact with one another, and (3) that attempts to change behavior are more likely to succeed if they address these multiple influencing systems (Glanz, Rimer, & Viswanath, 2008). The ecological model of human development posits that human beings exist and act within systems that include the microsystem (persons and institutions with whom one interacts directly), but also the mesosystem (interactions between the entities in the microsystem not involving the individual- connections between family and school, for instance), and the exosystem (which includes government, school organization, etc.) (Bronfenbrenner, 1979). Figure 2.1 is a representation of the ecological model applied to the postsecondary environment. There is good empirical evidence to support this framework across various domains, including physical activity, youth smoking interventions, and an international study of alcohol abuse (Glanz et al., 2008). Additionally, a growing set of studies supports the ecological assertion that college alcohol interventions that address multiple systems (individual, peer, community) are more likely to be effective than single-component interventions (Saltz, 2011; Toomey et al., 2007). The present study utilizes an ecological framework because it assumes that interactions with one's environment (in this case, one's peers) can have a profound effect on individual drinking behaviors. Additionally, it proposes

that the impact of friendship groups differs based on one's position within a social network and that peers have influence through different processes, depending on the nature of the relationships.

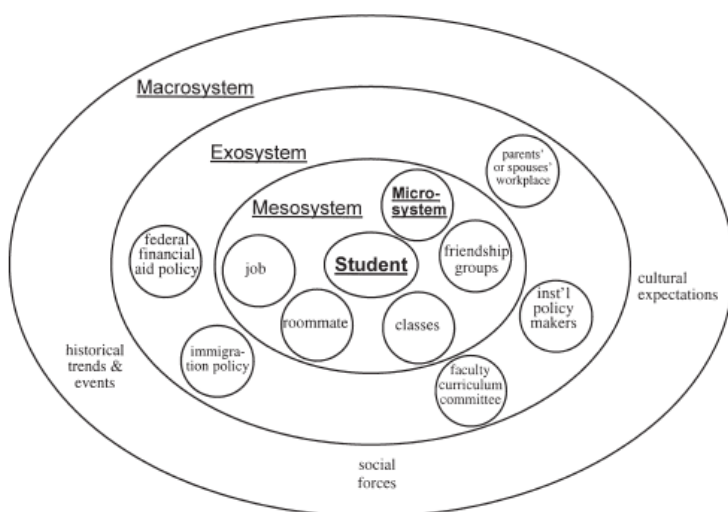


Figure 2.1 Bronfenbrenner's Model Applied to Higher Education (Renn & Arnold, 2003, p. 268)

### **Social Learning Theory/Social Norms**

One foundational explanation of behavior is Bandura's (1977) Social Learning Theory (SLT). SLT posits that human beings learn a great deal of how to behave from other human beings, both by explicitly being told or taught or through observation and modeling (Correia et al., 2012). So an SLT understanding of adolescent drinking would predict that: (1) adolescents form their attitudes about drinking by observing role models (peers, parents, etc.), (2) they imitate the observed behaviors, (3) the behavior is socially reinforced, and (4) that reinforcement leads to internal expectations for positive consequences (Abar & Maggs, 2010). In a broader way, SLT provides a framework to describe the way



behaviors might spread through a network as well. Because “individuals tend to change their behavior in the direction of reducing the differences between themselves and their interpersonal environments,” a person’s perception of what is common or appropriate in a certain situation will affect that person’s behavior. So, in this way, typical behavior becomes normative (Caboni et al., 2005, p. 539).

Perception of peer drinking norms has been shown to be the best single predictor of college student alcohol use (Neighbors et al., 2007). Norms can be divided into two basic types, descriptive and injunctive. Descriptive norms deal with what is normally done (behaviors, or “norms of is”) and injunctive norms are perceptions of what others approve or disapprove of (norms of “ought”) (Borsari & Carey, 2001). It is important to note that a person’s perception of the norms, regardless of the accuracy of that perception, is the driver of behavior. It is a consistent finding that college students’ perceptions of drinking norms are inaccurate, with students consistently overestimating how much other students drink and approve of certain drinking behaviors. These misperceptions, rather than the actual behavior of peers, predict individual drinking behavior (Borsari & Carey, 2003). Norms are also not always explicitly conscious; they are recognized more readily when someone violates them (Caboni et al., 2005).

How “strong” a norm is depends generally on the amount of approval or disapproval generated, which is understood through the concrete consequences (be they material or relational) of violating a norm (Caboni et al., 2005). Norms also do not affect behavior in the same way in all situations, the extent to which a norm is salient in a given situation is a major factor in whether that norm will predict behavior (Cialdini, Reno, & Kallgren, 1990). Additionally, norms that are more personal or deal with proximal groups (i.e. one’s closest friends) tend to be more influential than those of institutions or distal groups (“average college student,” “students at this institution”) (Borsari & Carey, 2001; Lewis & Thombs, 2005).

As stated above, the influence that norms exert on individuals stems from a desire to avoid consequences, gain rewards, or simply align with others. Perceptions of norms are constructed from observable behaviors, direct and indirect communications, and from knowledge of the self (individuals

assume others act/believe as they do) (Borsari & Carey, 2003). Though they are rooted in some observable behavior and direct consequences, norms are in a way, a generalization of sorts of direct interpersonal influence. They are an amalgam of how one perceives others behave or believe one should behave in certain situations. . One body of social psychology examines interpersonal influence more directly and some findings are particularly applicable to this study.

### **Social Influence Processes**

The work of social psychologist Herbert Kelman attempts to understand how and why some influence attempts or processes are more or less successful than others. He divides the ways in which individuals influence one another into three processes: compliance, identification, and internalization (Kelman, 1958). Compliance occurs when an individual wants something from the other, such as a reward or to avoid a negative consequence, and it often takes the form of response to a request. Identification, on the other hand, stems from the fact that “humans are fundamentally motivated to create and maintain meaningful social relationships with others” (Cialdini & Goldstein, 2004, p. 598). This process describes the ways in which we are influenced by others in order to establish or maintain satisfying relationships. This can take the form of actions intended to develop relationships with others, or as a more classic form of identification (emulating another person that one admires) (Kelman, 2006). Internalization refers to situations in which individuals accept influence attempts in order to act in congruence with their own values or identity.

In this way, the varying power of influence depends on individuals’ interests, relationships, and identities (Campos, Dignum, & Dignum, 2009). The source of the influence is also important. If a source has power or control over material rewards or consequences, compliance is more likely (Cialdini & Goldstein, 2004). More generally, if a source is seen as likable, attractive, or credible, successful influence attempts are more likely (Albarracín & Vargas, 2010).

This framework is helpful in understanding the different ways in which certain actors in a network can be influential. For example, a person very central in a friendship network may have influence because of his relationships or likability, whereas individuals with leadership positions in an organization might influence others through compliance. This study operationalizes influence several different ways. These include: (1) centrality in a friendship network, (2) leadership positions, (3) peer nominations for “who is fun to drink with” (influence based on likability), (4) peer nominations for “who do you admire or look up to” (influence based on identification), and (5) peer nominations for “who is able to drink/party without losing control or causing problems for himself or others” (credibility/emulation). It is perhaps more accurate to say that the preceding list is actually operationalizing influence potential or influence agents, rather than influence itself. It would be an exceedingly complex task to delineate how much one person is actually influencing the behavior of those around them, so social network analysis has traditionally used various measures of centrality to approximate influence (Ali & Dwyer, 2010; Ennett et al., 2006; Fletcher, Darling, & Steinberg, 1998; Gest, Osgood, Feinberg, Bierman, & Moody, 2011; Moody et al., 2011; Phua, 2001; Reifman et al., 2006). An actor with no ties to a particular network has virtually no potential to influence that network. With more ties, the potential and likelihood of influence increases.

There are developmental reasons that indicate that peer influence might be particularly powerful for drinking behaviors in traditional-aged college students. First, for most college students drinking is an inherently social act- very few drink alone (Lange, Johnson, & Reed, 2006). Second, throughout adolescence, the influence of one’s peers grows in importance (as the influence of parents declines) (Miller & Nirenberg, 1984). Identity formation is an important developmental task at this stage in life, so for many adolescents a sense of belonging and group affiliation are particularly salient (Lederman & Stewart, 2005).

Any examination of peer influence must include a discussion about selection. Studies that show that peer variables are predictive of individual behaviors or outcomes beg the question of whether those

relationships exist because of peer group influence (also called socialization), or because of peer group selection (the tendency of individuals to seek out relationships with others that are similar to themselves) (Borsari et al., 2009; Duncan, Boisjoly, Kremer, Levy, & Eccles, 2005). A more thorough discussion of studies that attempt to separate and understand these distinct processes will be presented later in this review, however it is helpful to note that most scholars grant that both processes generally occur and influence one another (a phenomenon sometimes called “reciprocal determinism”) (Borsari et al., 2009).

### **Social Network Analysis**

Social Network Analysis (SNA) is a set of methods that examine groups of individuals. Rather than focus solely on attributes of individuals, SNA studies relationships (Valente, 2010). It provides mathematical models of relations and has roots in sociology, anthropology, and psychology (Freeman, 2004). Specifically, SNA methods initially developed with representations of individuals (actors) in a group as a matrix, with a binary indicator representing whether or not there was a relationship between any two actors (Thomas, 2000). This matrix provides information about actors’ positions in the network, which includes measures of centrality (whether or not one is linked to many others or linked to certain influential others, or a key link between subgroups, etc.) (Valente, 2010). It can also describe properties of the overall network, including “density” (of the possible ties, how many exists), “transitivity” (how often are “friends of friends” linked together), and how often links are reciprocal (how often both actors report a relationship, rather than just a “one way” link). SNA allows for a graphical representation of networks and enables researchers to see how certain individual attributes affect their relationships and network position.

Social network analysis is therefore a method particularly suited to the research questions posed in this study. Because this study attempts to understand the peer environment and explores social

influence, using SNA allows for a robust set of data that includes information on relationships between actors as well as individual attributes.

## **Empirical Studies of College Student Alcohol Use**

### **Individual influences.**

There is a body of previous research that focuses the ways in which individual attributes affect drinking behaviors. This section will summarize some findings. Male students are more likely to drink dangerously than their female counterparts, white students exhibit heavy episodic drinking (HED) at higher rates than black, Asian, or Hispanic students (Kahler, Read, Wood, & Palfai, 2003). Students involved in fraternities or sororities or who are members of athletic teams drink at higher rates than students who are not involved in these activities (Ham & Hope, 2003). Other individual factors that have been linked to dangerous drinking behaviors include anxiety, early age of onset of recreational drinking, sensation-seeking personality (Christiansen, Vik, & Jarchow, 2002; Fenzel, 2005; Kahler et al., 2003).

Students' mindset and beliefs about drinking also affect drinking outcomes. One set of research in this area examines students' individual motives for drinking. Coping motives, or drinking to deal with problems or stressors was the most powerful individual predictor of dangerous drinking in one study (Neighbors & Lee, 2007), and shown to be influential in several others (Baldwin, Oei, & Young, 1993; M. Christiansen et al., 2002; Hull & Bond, 1986). Another set of research in this area examines alcohol expectancies. Alcohol Expectancies can be defined as "beliefs held by an individual about the effects of drinking or the possible outcomes of drinking" (Oei, Fergusson, & Lee, 1998, p. 704). Expectancies include beliefs about the likelihood of various outcomes, and likely develop to some extent even before direct experience with alcohol (B. A. Christiansen, Goldman, & Inn, 1982; Ham & Hope, 2003). Therefore if a student has high expectancies for positive outcomes from drinking, coupled with low

expectancies of negative outcomes (including the belief that these negative outcomes are relatively benign), that individual is more likely to drink at higher levels. This mindset potentially exposes the student to more alcohol-related problems. Expectancies that have been empirically linked to problem drinking include: enhanced social functioning or social rewards, enhanced attractiveness or sexual relations, positive mood, and increased self-confidence, (M. Christiansen et al., 2002; Dimeff et al., 1999; Hull & Bond, 1986; Oei et al., 1998). Self-regulation is another intrapersonal variable that has been shown to affect student drinking outcomes. In one study, self-regulation (a concept that deals with goal-directed behavior, the ability to delay gratification, and the ability to self-monitor) predicted alcohol-related consequences, rate of change for consequences over time, and rate of change in drinks per week over time (Hustad, Carey, Carey, & Maisto, 2009). Another similar factor is drinking refusal self-efficacy (DRSE). This refers to beliefs about one's ability to resist drinking in certain situations and lower DRSE has been shown to predict higher drinking frequency (Baldwin et al., 1993; Oei et al., 1998).

Some literature has focused on the relationship between drinking and year in school. These studies have found that measures of dangerous drinking (HED, consequences) consistently find that first year students are at increased risk, which normalizes later on (Baer, 2002; Lederman et al., 1998; Schulenberg et al., 2001; Timberlake et al., 2007; Wechsler, Lee, Kuo, & Lee, 2000). Other studies have shown that frequent light drinking increases with year in school and frequent heavy drinking decreases (Wechsler & McFadden, 1979). One study found that more first year women believe alcohol to be “central to social life” than do women in their junior year (Lederman & Stewart, 2005). Most explanations for this increased risk in the first year of college include lack of drinking experience, or increased pressure to develop friendships or fit in (which can lead first year students to be more likely to accept offers of alcohol) (Borsari & Carey, 2001). These theorized social explanations for increased use and consequences among first year students will be discussed more in the “Peer Selection and Influence” section.

**Environmental influences.**

The Harvard College Alcohol Study found large variance in HED rates at different colleges (from as low as 1% to as high as 76%), though the rates at institutions proved very stable over time (Wechsler & Nelson, 2008). Institutional factors that predicted higher HED rates include schools in the northeast, schools with a prominent Greek system and schools in which college athletics are prominent (National Institute of Alcohol Abuse and Alcoholism, 2002). Conversely, 2-year, commuter, and religious institutions all tended to have below average HED rates. Other factors that predict a higher HED rate include high residential population, high density of alcohol outlets in the immediate area, and low-priced alcohol (Wechsler & Nelson, 2008).

Campus traditions/customs involving alcohol and significant college events are also related to dangerous drinking. One study of alcohol-related legal infractions in a college town found (unsurprisingly) that they increased on weekends, days of football games, and fraternity and sorority rush week (Juth & Smyth, 2010). These types of events are often cited as contributing to a self-perpetuating “culture” of dangerous drinking (National Institute of Alcohol Abuse and Alcoholism, 2002).

Research in this area is more difficult because the effects of environmental factors are often not as direct as some individual influences. Similarly, it is more challenging to establish research evidence for interventions that target environmental influences. Though only very large, multi-institutional data collection efforts are well-suited to assessing environmental interventions, some have met with success. These include efforts to enforce minimum drinking-age laws, limit access to alcohol and limit drink specials that offer steep price discounts (Saltz, 2011; Toomey et al., 2007). Much of the terrain around environmental influences and interventions that target them remains unexplored. However their promise for having a population-level effect and the positive results of the few existing studies suggest that this area is worthy of continued study.

## **Greek Population**

This study focuses on students in Greek organizations (social fraternities and sororities). Students in Greek organizations engage in heavy episodic drinking more than other students, are at greater risk for alcohol-related problems, and are especially resistant to interventions (Carey et al., 2007; Ham & Hope, 2003). The same is true for students in athletic teams and both groups are comparable in several ways (which presents an interesting opportunity to extend the research described here). Studies suggest that selection plays a large role in the overrepresentation of problem drinkers among fraternities and sororities (frequent high school drinkers seek out Greek affiliation as an environment in which heavy drinking is the norm) (Borsari et al., 2009). There is also some evidence that increased access to alcohol (through older members) may play an outsized role in increasing drinking among members, which normalizes after sophomore year (Park, Sher, Wood, & Krull, 2009). Greek members show a greater misperception of norms, but they accurately rate the drinking of Greek students higher than non-Greek (Borsari & Carey, 2003; Borsari et al., 2009). So rather than reduce their drinking when they understand the true norm, normative interventions are not as effective because these students recognize already that they may be above the norm. One very interesting element of Greek students with regard to peer norms has to do with identity and group affiliation. Rush and pledge periods are designed to intentionally perpetuate group values, traditions, and norms, which may result in greater pressure towards conformity to perceived drinking norms (via compliance) (Park et al., 2009).

This formalization of group norms is one reason this population is particularly apt for the study described here. Also, these organizations represent manageable and somewhat bounded social networks (in that it is clear who is in the network and reasonable to expect that most members are familiar with all other members and socialize with one another regularly), which is ideal for social network analysis. In terms of implications for intervention, Greek organizations have not only been shown to be resistant to some existing efforts, but also they may have an outsize influence on alcohol norms and traditions campus-wide. The Harvard CAS study found a prominent Greek system to be a predictor of higher



campus-wide HED rates (Wechsler & Wuethrich, 2002). These organizations tend to host social functions that involve alcohol and there may be an increased visibility for members on campus (through wearing letters and other public displays). In this way it could be said that these organizations might be natural “opinion leaders” for a campus with regard to drinking norms.

### **Peer Selection and Influence**

The importance of a student’s peer group is recognized in higher education research and theory. According to Astin (1993) peers are “the single most potent source of influence” in the lives of college students. Various studies demonstrate empirical evidence of peer group influence on a variety of outcomes (degree attainment/persistence, GPA, engagement, etc.) (Pascarella & Terenzini, 1991, 2005; Weidman, 1989). Similarly, within substance abuse literature, one of the “most consistent and reproducible finding in drug research” is strong relationship between individual’s substance use and friends’ use (perceived and actual) (Kandel, 1980, p. 269).

This phenomenon of like individuals associating is known as homophily (McPherson, Smith-Lovin, & Cook, 2001). Conceptually, it may be the result of peer selection (like peers seek one another out and develop friendships based on shared traits/activities) or influence (adopting new behaviors because of association with peers). Most scholars accept that both processes have some effect and are mutually reinforcing (Borsari et al., 2009). In studies of college students, some have found that selection has a larger effect when students first enter the college environment and that thereafter influence plays the larger role (Abar & Maggs, 2010). Among students in Greek organizations, selection effects were found for precollege drinking as well as impulsivity/novelty-seeking and extraversion (Park et al., 2009).

Unlike studies on substance use in earlier adolescence, relatively few studies of college students have attempted to delineate the separate effects of selection and influence (Abar and Maggs, 2010). Some have attempted to remove selection by studying the impact of random roommate assignment in first year

students. These studies reveal that students assigned a roommate that drinks alcohol have a slightly lower GPA and drink more than those assigned a nondrinking roommate. These effects are especially sharp if the participant drank in high school (Duncan et al., 2005; Kremer & Levy, 2008).

One review of peer influences on college student drinking divides the mechanisms into three categories: overt offers of alcohol, modeling, and peer norms (Borsari & Carey, 2001). Overt offers of alcohol can range from a friendly suggestion to an order to drink. In certain situations (like fraternity or sorority “pledge” period), group membership and alcohol are tied together, with group membership held up as a material reward for compliance, or access to alcohol held as a privilege of membership (Arnold & Kuh, 1992; Borsari et al., 2009; Kuh & Arnold, 1993). Drinking refusal self-efficacy is also a factor in understanding the influence of overt offers. Studies have shown that year in school, socializing with an established group of friends, and social ease are positively correlated with being able to refuse overt offers of alcohol (Klein, 1992; Shore, Rivers, & Berman, 1983).

Studies have also attempted to directly ascertain the effect of peer modeling in drinking situations. These “confederate” studies place college student participants in a situation with one or more other students (confederates). The attributes and drinking behavior of these confederates is intentionally manipulated by the experimenters to see what effect it will have on participants. The findings of these studies mostly coincide with the social influence theory described above. Namely, participants tend to match the drinking rate of the confederate, match the majority when in the presence of a mixed group of heavy/light drinking confederates, and be more influenced by warm, sociable confederates (Collins, Parks, & Marlatt, 1985). Overall a heavy-drinking confederate leads to heavier drinking than a light-drinking confederate or none at all and a confederate’s current drinking rate is more influential than previous observation (Borsari & Carey, 2001).

However the element of peer influence that receives the greatest amount of attention in the college student drinking literature is the effect of norms. Some well-established findings are that college students overestimate the amount other students are drinking (by multiple measures including HED), that

these misperceptions hold true regardless of reference group (students at this institution, friends, best friend, etc.), and that these misperceptions predict heavier drinking by individuals (Borsari & Carey, 2001, 2003; Perkins & Craig, 2012). Some social psychology research suggests that descriptive and injunctive norms affect behavior differently (Cialdini & Goldstein, 2004). However both have been shown to have a significant effect on drinking and other health behaviors (Larimer, Turner, Mallett, & Geisner, 2004). At least one meta-analysis suggests that results are inconclusive as to whether one type is more influential than the other (Scott-Sheldon, Demartini, Carey, & Carey, 2009).

The fact that so many interventions aim to correct misperceptions of social norms also speaks to the influence of this concept. Although indicated interventions that use personalized normative feedback have solid evidence of effectiveness, social norms campaigns have shown mixed results (Dejong et al., 2009). Social Network Analysis studies have contributed to a closer look at these processes. The way in which students are individually positioned within social networks can have a sizable impact on the way these peer variables affect drinking behavior. There is a larger body of social network analysis research that examines adolescent substance use behavior with students in middle and high school, while SNA studies on college student drinking are relatively rare. One stable finding from the studies on younger adolescents is that network centrality is related to alcohol use and earlier uptake (Ali & Dwyer, 2010; Ennett et al., 2006; Fletcher, Darling, & Steinberg, 1998; Gest, Osgood, Feinberg, Bierman, & Moody, 2011; Moody et al., 2011).

This same relationship between alcohol use and centrality is echoed in an SNA study with college students (Reifman et al., 2006). Interpreting the meaning of this relationship between substance use and centrality may be more complex than it seems. For example, is substance use socially rewarded (a quality that can confer status and make a student popular), or are substance use behaviors adopted earlier by more socially central students because those students are exposed to more opportunities for substance use? Analyses from a large, longitudinal sample of middle school students suggest that both

processes are relevant (alcohol use is a high-status activity, but more friendships also expose students to more opportunities for drinking) (Moody et al., 2011; Osgood et al., 2013).

However, the lives of younger adolescents (middle and high school) differ in many ways from the lives of college students. The goals of intervention differ with age group as well. Because early initiation of substance use has been shown to be a risk factor for problems throughout the life span, the goal of many programs with younger adolescents is to delay initiation (Valente et al., 2007). This is quite different from the harm reduction approach that dominates in higher education. It is possible that among college students, a point of diminishing returns exists beyond which more extreme drinking behaviors do not result in status and approval, but disapproval. SNA studies on college students suggest a less direct relationship between centrality and alcohol use. Two studies show that the centrality relationship is more aptly described as a relationship between alcohol use and higher levels of social interaction (Fondacaro & Heller, 1983; Reifman et al., 2006). In a study of one class cohort of fraternity men in the first and third year of college, though there was an overall relationship between heavier alcohol use and centrality, of the two most extreme drinkers, one was located centrally and the other peripherally (Phua, 2011). Additionally, in the third year of college these two drinkers reduced to more moderate use, as did the most central cluster in the network. These results suggest that there may not be not a direct, linear relationship between centrality and heavier substance use, thereby disputing causal claims that heavier drinking is socially rewarded without qualification.

Centrality can be said to be a measure of influence potential, or status. However there exists little agreement over what constitutes “social status” with regard to college student drinking. Early confederate studies investigated whether a “high-status” confederate would affect drinking behavior differently than one that was “low-status,” but status in this case was operationalized as a confederate wearing nice, more formal clothes as opposed to being dressed more shabbily (Collins et al., 1985). Another set of studies found a positive relationship between “social capital” and moderate drinking, with social capital operationalized as participation in volunteer organizations (Weitzman & Chen, 2005;

Weitzman & Kawachi, 2000). Both of these studies have merit, these conceptions of status differ qualitatively from being a model for other college students with regard to drinking behaviors. For school-aged children and adolescents, status can be synonymous with popularity. Some network studies collect sociometric popularity (based on friendship nominations) and perceived popularity (asking participants who they think is popular). At least one such study found the two indicators to be differently related to various outcome behaviors (Moody et al., 2011).

The questions used in SNA studies reveal different types of relationships between actors in a network, which can be said to reveal different types of status as well. For example, some studies ask participants to report whom they turn to for advice about certain issues, which represents a qualitatively different kind of affiliation (and resulting status) than something like friendship. One network study with college students found significant effects for how many “drinking buddies” participants identified in their networks, separate from the main effect of average drinking behaviors across all nominated friends (Reifman et al., 2006). Based on Kelman’s different processes of influence and Cialdini’s description of norm salience, it is plausible that “drinking buddies” might be more influential than other friends when it comes to drinking behaviors, because they are models in that particular domain, or simply more likely to be around the participant when he or she is drinking. In this way, different types of relationships and status can be uniquely related to drinking behaviors.

Another way to more closely understand the processes of peer influence is to examine the ways in which it can be a positive or protective factor. For example, as mentioned earlier, socializing with an established friend group was shown to increase ability to refuse drink offers. Other data also suggests that as students get more comfortable socializing with peers in the college setting and “gain the pleasure of social contact and friendship without having to drink,” dangerous drinking decreases (Lederman & Stewart, 2005).

One review, “How the Quality of Peer Relationships Influences College Alcohol Use” (Borsari & Carey, 2006), identified three pathways through which peer relationship quality influences drinking: when

alcohol use becomes an integral part of peer interactions, when peers disapprove of alcohol use, or the lack of or breakdown of peer relationships. This third pathway describes a relationship found in the research between a lack of peer relationships and heavy drinking. This idea of isolation as a risk factor is also found in one SNA study on middle school students, in which “social embeddedness” (having a higher density network “neighborhood,” having a best friend relationship that is reciprocal, and naming few out-of-network friends) was negatively related to measures of alcohol and marijuana use (Ennett et al., 2006).

Other research has also found widespread consensus among college students (from abstainers to heavy drinkers) on disapproval for certain drinking behaviors. In an investigation of norms broadly (not just alcohol-related), Caboni et al. (2005) found that “intrusive substance use behaviors” (behaviors that affect students beside the user) was the second-most “inviolable” norm in the study, with 73.8% of students agreeing that it should not be violated. One focus group study on Danish young adults who were experienced drinkers found patterns of disapproval that persisted across friend groups (Demant & Järvinen, 2011). Specifically they found that although “controlled drunkenness” was approved of and resulted in social capital, other forms of heavy drinking (“losing control,” drinking alone, or drinking “for the wrong reasons”) met with disapproval. Disapproval for certain drinking motivations (drinking “for the wrong reasons”) was echoed in an American focus-group study of college student drinkers, which found that drinking to escape problems or to get drunk were identified by students as problematic drinking (along with loss of self-control, frequency, and harm to self or others) (Lederman & Stewart, 2005).

### **The Present Study**

What is obvious from the literature is that disentangling the various social mechanisms that affect college student drinking is a difficult and complex task. Students’ individual experiences and alcohol

expectancies shape and are shaped by the peers with whom they socialize in various ways. This study aims to understand more fully these mechanisms by addressing the question: What are the relationships among drinking behaviors, social relationships, and status within a social network? There are three specific goals of this study that correspond to the three sub-questions.

The first goal of this study was to determine whether or not students recognize problematic drinkers in their social networks. Research on social norms has shown that students consistently overestimate the degree to which their peers engage in dangerous drinking behavior and the degree to which peers approve of this type of behavior (Borsari & Carey, 2001, 2003; Perkins & Craig, 2012). Existing research also describes a “culture” around dangerous drinking that supports and perpetuates risky behaviors through peer influence (National Institute of Alcohol Abuse and Alcoholism, 2002). Taken together, one might assume that students are unable to recognize problem drinking in their peers. However, social norms research has also revealed that students consistently rate themselves as below the norm in regard to their own drinking (Borsari & Carey, 2003). This finding suggests that some assessment of others’ drinking and self-comparison takes place. To investigate this question quantitatively, this study examined self-other agreement to check test the accuracy of students’ perception of peers in their network against self-reported drinking data (Kenny, 1994). The hypothesis was that students are able to recognize problem drinkers in their networks with some level of accuracy.

The second goal of this study is to contribute to the understanding of social status among college students as it relates to drinking. The strong influence of peers in college student drinking is well-established. However, researchers also note that social groups and the relationships among students within them are unique. The fact that social norms campaigns disregard this variance is often cited as a disadvantage of the approach (Barnett et al., 1996; Polonec et al., 2006; Wechsler & Wuethrich, 2002). So a more comprehensive understanding of the way social relationships are related to drinking behaviors within individual social networks could be beneficial.

Who can be identified as influential or high-status depends heavily on the specific question asked of participants. Some network studies use indicators of friendship, while others might ask participants who they go to for advice about certain topics. To that end, participants were asked to nominate peers based on a number of criteria, including friendship, who is fun to drink with, and who one looks up to or admires. Participants also reported whether they had ever held a leadership position in the organization. These different conceptualizations have a theoretical basis and represent an attempt to parse qualitatively different processes of influence (Albarracín & Vargas, 2010; Kelman, 2006). The friendship and “who is fun to drink with” networks both represent sources of influence based on likability, “who do you look up to or admire” is a more classic form of identification, whereas leadership positions could potentially capture a form of compliance.

I also hypothesized that these different ways of operationalizing status would have slightly different relationships to drinking behaviors. Previous studies have shown links between drinking is positively related to popularity (Ennett et al., 2006; Moody et al., 2011; Reifman et al., 2006), but other qualitative research has shown that certain drinking behaviors result in disapproval from peers (Caboni et al., 2005; Demant & Järvinen, 2011; Lederman & Stewart, 2005). Based on this, “who is fun to drink with” was hypothesized to be more positively related to alcohol use variables and status indicators like leadership positions and “who do you look up to or admire” were hypothesized to have weaker or negative relationships to alcohol use.

Also based on the qualitative work on peer disapproval for certain types of drinking behaviors, it was hypothesized a positive association between drinking and friendship might not hold true at extreme levels of drinking, even if an overall association exists. Another hypothesis was that students are more likely to disapprove of problematic drinking (operationalized as alcohol-related consequences) as opposed to higher quantities of drinking that don’t necessarily have visible consequences. Drinking in higher quantities was not identified in the research as a behavior that might generate disapproval. Indeed it seems fairly unlikely that students would be counting one another’s drinks in a party setting, so it stands



to reason that the more visible alcohol-related problems would have a stronger relationship to friendships and status than quantity.

The third goal is to explore if willingness to intervene or express disapproval for extreme drinking behaviors is related to friendships and status. Better understanding students' willingness to intervene could be instrumental in developing bystander intervention programs. This study hypothesizes that social status might play a role because some qualitative research has shown that students only approve of certain types of drinking behaviors ("controlled drunkenness"), but that they are reticent to intervene for fear of social reprisal (being seen as "the grandma" of the group, or not being fun to drink with) (Demant & Järvinen, 2011). It was hypothesized here that social status would be positively related to willingness to intervene.

Taken together these goals represent an important step in better understanding the peer influence processes at play with regard to college student drinking. Few studies using social network analysis have focused on college student alcohol use. Those that do have not addressed students' perception (or lack thereof) of problem drinkers, different conceptualizations of status, or pressure to conform and willingness to intervene. The present study aims to address these gaps and contribute to understanding that can help develop more effective interventions. In the next chapter, I will address the methods I used to study these questions.

## **Chapter 3**

### **Methods**

#### **Participants**

The unit of analysis for the present study is individual students. Data was collected from multiple organizations, but not enough to power meaningful group-level comparisons. So the focus of data collection was on getting enough participants to power meaningful individual-level analyses. Though there are multiple distinct networks, this study uses a correlational design, so the variables examined in can all be studied across groups. In social network analysis, having data from all members of a network is optimal, so data collection methods were designed to capture the highest possible percentage of members from each group in the study. Getting participation from all members of a Greek organization certainly poses a challenge. However, these groups typically have chapter meetings on a weekly basis. By attending a chapter meeting and distributing the instrument there, I was able to capture the vast majority of members from each group. I requested that the leadership of each organization ask members who were not in attendance to get in contact with me to take the survey at a later date, which lead to approximately seven additional participants.

Overall, 200 students participated in the study, from 8 different organizations (n=200). The 8 discreet networks collected range in size from 9 members up to 41, with a mean of 25. Those numbers reflect the number of surveys collected from each network, not the number of students listed on the roster at the time of data collection. Students were provided the entire roster for nomination, but participants that did not complete surveys were dropped from the network during the analysis. Overall 82.6% of active members of the participating organizations completed the survey, ranging from a high 91.89% for one organization to a low of 68% of another. The sample was 37.5% male and 62.5% female. This gender

breakdown is proportionally representative of the Greek population at the institution where the female organizations on average are larger than the male organizations.

As mentioned above all participants were current members of a fraternity or sorority at the time of data collection. Only current students are eligible to be active members of these organizations, so all participants are enrolled college students. Additionally, there are many types of Greek organizations, including: honor societies, fraternities and sororities organized around a particular academic major or interest, and coed community service organizations. However this study includes only traditional single-gender organizations not centered around an academic interest (what are sometimes referred to as “social” fraternities and sororities).

Participants were drawn from one small, private, liberal-arts College in the Northeast United States. The Greek system at the institution includes 320 active members (20% of the overall student body) and includes 7 fraternities and 6 sororities. The college has a higher than average binge drinking rate, assessed at 68.0% of all students in Spring 2013, compared to a national average that usually hovers around 45% (Ham & Hope, 2003). In addition, the school demonstrates many of the institutional factors that predict higher binge drinking rates, including: being located in the northeast, being highly residential, and having prominent Greek Life and athletic programs (National Institute of Alcohol Abuse and Alcoholism, 2002).

## **Measures**

The survey administered in this study consisted of existing instruments reproduced from previous research, modified existing instruments, and unique scales and questions. Each part of the survey is described below, but a chart describing the various sections is presented in Table 3.1. The full survey instrument is available in Appendix B.

Table 3.1

*Description of Survey Instrument*

<u>Section</u>	Number of Items	Existing, Modified, or Unique
Questions about organization and relationship to organization	4	Unique
Willingness to intervene scale	10	Unique
Approval of friend drinking behavior	10	Modified
Self-reported drinking	17	Existing
Alcohol consequences	24	Existing
Protective behavioral strategies	23	Modified
Attention-check question	1	Unique
Network nominations (friends, drinking buddies, admire, problem drinker, non-problem drinker)	5	Unique
Perception of norms in friends, organization, institution	13	Existing
Demographics	10	Modified

Demographic variables were collected at the end of the survey, along with individual factors shown to be related to alcohol use in college students, including: age, year in school, GPA, age of first drunkenness, weight (for calculating peak Blood Alcohol Content), and family history of alcoholism (one item). This section also included one item asking students to report if they have held a leadership position within the fraternity or sorority. This was examined as another status indicator. Gender was not a survey item, but was included as a demographic variable because participants are in single-gender organizations. So two different versions of the instrument were used based on the gender of the organization. The only difference was gender pronouns and the designation “fraternity” or “sorority.” For clarity, the examples presented in this section are from the female version.

The first section of the survey asked students about their organization and their relationship to the organization. Two items were included to capture students that may be less active in the organization, or may spend a significant amount of time with friends that are not in the organization. These items were included because there may be a qualitative difference in a student who scores low on centrality, but reports being active in the group, and a student with a low centrality score who reports the majority of his

close friends are outside of the organization. The first item asked students to rank their agreement on a likert scale (1-5 from “strongly disagree” to “strongly agree”) with the item: “I attend almost all meetings and functions of my sorority.” The second item asked for agreement with the item: “all or almost all of my close friends at school are members of this sorority.”

The next set of items assessed participants’ willingness to intervene or express disapproval for certain drinking behaviors. Because no existing instrument was found in a review of existing literature, this scale was designed specifically for the present study. Five items asked participants to rank how likely they would be to perform certain actions, on a scale from 1 (extremely unlikely) to 5 (extremely likely). Five additional items asked participants if they have performed the described action in the past year. The actions described included: “If I had a friend whose drinking was causing problems for him/her I would talk with my friend about reducing his/her drinking at a time when we were both sober,” “While at a party or drinking occasion, if I saw a person that appeared too drunk, I would try to help that person by suggesting he/she slow down or stop drinking,” and “While at a party or drinking occasion, if I saw a person that appeared too drunk, I would try to help that person by telling someone who could better deal with the situation (friends, authorities, etc.).”

The next items asked students to rank their approval for different drinking behaviors (drinking every day, driving after drinking, etc.). These items were drawn from the House Acceptability Questionnaire (HAQ) (Larimer, 1992) and a structurally similar series of items developed by Baer (1994). Participants were then asked about their individual alcohol use. This study utilized multiple measures of alcohol use in order to discern these within-network differences. To that end the study contained one item measuring HED, borrowed from the Harvard CAS (Wechsler & Wuethrich, 2002). When administering to male students, the question read “five or more drinks in a row.” Next it utilized the Daily Drinking Questionnaire (DDQ) (Collins et al., 1985; Dimeff et al., 1999). The DDQ asks respondents to report both number of drinks and hours spent drinking for each day of a typical week. This allows the researcher to calculate drinking days per week, total drinks per week, typical weekend drinking, average

drinks per drinking day (Correia et al., 2012). Including the hours allows the researcher to also calculate BAC rather than just number of drinks. Finally, this section included one item that asked students to recall the single heaviest drinking day over the past month and to report both number of drinks and hours spent drinking on this day. This was used to determine maximum BAC for the past month, a common single-item measure in studies of college student drinking (Correia et al., 2012).

The following section measured alcohol-related consequences. This section utilized a pre-existing instrument, The Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ) (Kahler, Strong, & Read, 2005). The B-YAACQ contains 24 items that ask respondents to report whether or not they have experienced a certain alcohol-related problem within the past year. The items are all scored in a yes/no format, allowing for a score ranging from 0-24. Repeated studies have shown that the B-YAACQ has internal consistency, test-retest reliability, and correlates in the expected direction with related constructs (Correia et al., 2012).

The next section measured protective behavioral strategies (PBS), using a modified version of the Protective Behavioral Strategy Survey (PBSS) (Martens et al., 2005). This scale asks students to report how often they use specific strategies while drinking, on a scale from 1 (never) to 6 (always). Two other PBS measures have been developed recently, the Protective Behavioral Strategy Measure (PBSM) (Novik & Boekeloo, 2011) and the Strategies Questionnaire (SQ) (Sugarman & Carey, 2007). Although the PBSS was found to be a better fit for alcohol use and consequences in at least one review of all three using confirmatory factor analysis, the PBSM and SQ contain protective strategies that students identified in interviews not found in the PBSS. Additionally, one factor in the PBSS (containing three items) was not included because it was potentially too gendered and situation-specific for this study. The final result was a 23 item measure.

After an attention check question (“To show that you are paying attention to the questions in this survey and reading carefully, please select ‘I am not paying attention.’”), the next portion of the survey collected the network data. This study utilized the roster method to collect network data, in which

participants are given a roster with the names of the all the organization members (Valente, 2007).

Rosters were obtained for participating fraternities and sororities (not considered protected information by the institution) and students' last names were removed. Participants were asked to nominate peers in response to five questions:

- 1) Who are your close friends in the sorority that you spend the most time socializing with?
- 2) Who are the people that are most fun to be around in a drinking/party setting?
- 3) Who do you admire or look up to?
- 4) Who is able to drink/party without getting out of control or causing problems for herself?
- 5) Who loses control, or causes problems for herself or others while drinking?

The first question above collected a friendship network, some forms of which have been studied in their relationship to problem drinking behaviors (Phua, 2011; Reifman et al., 2006). The second and third network questions represent the different conceptualizations of status. The last two networks ask student to identify particular problem or non-problem drinkers from their social networks. The wording of these questions was drawn from existing qualitative research that describes types of drinking behaviors that generate peer disapproval (Caboni et al., 2005; Demant & Järvinen, 2011; Lederman & Stewart, 2005). For most of these questions, in-degree centrality (normalized to account for varying group sizes) will be the most pertinent measure (Valente, 2010).

The following section assessed the participant's perceptions of the descriptive and injunctive norms in the fraternity or sorority. Descriptive norms refer to how much other students are drinking, and injunctive norms describe how much others approve of drinking behaviors. Descriptive norms were measured using the Drinking Norms Rating Form (DNRF) (Baer, Stacy, & Larimer, 1991). The DNRF corresponds to the DDQ and asks respondents to report for each day of a typical week the number of drinks consumed by the average member of the organization. There are several instruments that measure injunctive norms, including the House Acceptability Questionnaire (HAQ) (Larimer, 1992) and a

structurally similar series of items developed by Baer (1994). This study used a similar structure, selecting items from both judged to be the most pertinent to this particular population.

### **Procedure**

The survey was administered in one seating, in a paper-and-pencil format. Though online methods were available for this type of data collection, paper-and-pencil allowed participants to complete the instrument during part of a chapter meeting more readily. I decided that paper-and-pencil was therefore preferable for getting a greater proportion of each organization to complete the survey.

The data analysis was conducted using a social network analysis software package called UCINET (Borgatti, Everett, & Freeman, 2002) and SPSS. The most essential procedures for the purposes of this study involved examining the relationships between the network data (which describe relationships between actors) and the self-report questions collected (which are attributes of individual actors; age, alcohol use, protective strategies, etc.). The networks on the instrument originally yield a matrix with binary indicators of relationships between each actor. However, to account for 8 discrete networks of varying sizes, this data was transformed into variables that described the centrality of individual participants. For all networks (friendship, “who do you admire,” “fun to drink with,” problem drinkers, and non-problem drinkers), the number of in-degree nominations was divided by network size. This resulted a variable that ultimately describes the proportion of available peers in the network that nominated the selected participant for that particular network. This is a fairly conventional procedure for dealing with groups of different sizes.

Research question one (“How do students recognize problem drinkers in their networks?”) was tested using self-other agreement (Kenny, 1994), a method of measuring the accuracy of a perceiver against a self-reported rating. In this case, peer nominations for problem drinking were measured against self-reported alcohol variables. Correlations were examined and a regression was constructed using



problem drinker nominations as the dependent attribute. Alcohol variables (total number of drinks in a typical week and alcohol consequences) were included as the independent vectors, along with some control variables. If self-reported alcohol use and consequences variables predict a significant portion of the variance in problem drinker nominations, then that supports the hypothesis that students can recognize problem drinkers in their networks.

Research question two (“How do different measures of status correlate to drinking behaviors?”) was addressed by examining the relationships between alcohol variables, the different status measures used in this study, and various control variables. The status measures include: the nominations described in the preceding paragraph and leadership positions. Similar to the previous research question, multiple linear regression models were used to determine the extent to which different status measures and alcohol variables are related.

Research question three (“What is the relationship between status and willingness to intervene or express disapproval for drinking behaviors?”), used a similar regression procedure, but this time with the dependent variable being the willingness to intervene scale.

## **Ethics**

There were several important ethical considerations in this study. It was important to make sure all participants recognized that participation was voluntary and to obtain informed consent. Because this study used the roster method, participants’ names were included in the initial data collection phase. However several steps were taken to preserve confidentiality. No names were included on the survey instruments that participants filled out, only unique ID numbers. The roster was on a separate piece of paper that was shredded immediately after data was collected. However, some anonymity concerns still existed due to the fact that students were nominating each other, which could be sensitive information (especially problem drinker nominations). One way of mitigating these concerns was through the

presence of the researcher at the time of data collection (chapter meetings). The researcher reminded students that the contents of each survey should remain confidential and also monitored whether participants are revealing answers to one another while taking the survey. Additionally, there is a research tradition of collecting network data (including peer nominations for things like substance use, aggression, and bullying), in which the act of nominating peers is not seen as inherently harmful to self or others. The placement of the network questions in the middle of the survey and administering the survey at the start of a chapter meeting were also design features meant to minimize students discussing their nominations with one another. The following chapter presents the results of the study.

## Chapter 4

### Results

#### **Question 1: Do students recognize problem drinkers in their networks?**

This question was answered by testing self-other agreement, a method of measuring the accuracy of a perceiver against a self-reported rating (Kenny, 1994). In this way I was able to test whether the nominations a participant received from peers in his/her network correlate to that student's own self-reported drinking behaviors. To account for the different network sizes, total nominations were divided by the number of respondents in the network, a fairly conventional way of accounting for different group sizes. The resulting variable (referred to hereafter as "problem drinker nominations") is effectively the proportion of network actors who nominated a particular participant as a problem drinker. Possible scores range from 0 (if no network actors nominated participant as a problem drinking) to 1 (if all actors in the network nominated participant as a problem drinker).

The concept of problem drinking is operationalized through multiple variables. The first is the B-YAACQ score. The B-YAACQ is an existing measure of alcohol-related consequences with demonstrated validity and reliability (Correia et al., 2012). The score from this instrument (hereafter referred to as "alcohol-related consequences") measures alcohol problems most directly, as opposed to the other alcohol variables that ask students to report drinking quantity. In this sample, Cronbach's alpha for the B-YAACQ was .834.

Reported measures of quantity and frequency of alcohol use are also included in this analysis. There are demonstrated relationships between use and consequences (Dimeff, Baer, Kivlahan, & Marlatt, 1999). Frequent or high-quantity use itself may be a concern, regardless of associated self-reported

problems/consequences. For this reason, self-reported drinks per week (derived from items on the Daily Drinking Questionnaire – Collins et al., 1985; Dimeff et al., 1999) and the self-reported maximum BAC in the previous month were also included in the analysis. A protective behavioral strategies score was also included in the analysis. Protective behavioral strategies are harm-reducing behaviors that students sometimes engage in while drinking. Examples include alternating alcoholic with nonalcoholic beverages, and determining not to exceed a certain number of drinks at the start of the night. Cronbach's alpha for the protective behavioral strategies scale was .917. The descriptive statistics of the alcohol use measures and problem drinking nominations are presented in table 4.1.

Table 4.1

<i>Descriptive Statistics of Alcohol Use Measures and Problem Drinker Nominations</i>					
	N	Minimum	Maximum	Mean	Std. Deviation
Prob. Drinker Nom.	192	.00	1.00	.1390	.18678
Alcohol Consequences	200	.00	19.00	6.8350	4.35691
Drinks/week	199	.00	67.00	13.8040	9.94070
Max. BAC	195	.00	.98	.2020	.16026
"Binge" Episodes (scale)	198	1	6	3.11	1.274
Prot. Behav. Strat.	193	10.00	113.00	69.3834	13.60255

As can be seen in the correlation matrix in Table 4.2, nominations for problem drinking were correlated with total number of drinks consumed per week ( $r=.303$ ,  $p<.001$ ), maximum BAC in the past month ( $r=.338$ ,  $p<.001$ ), number of “binge” drinking episodes in the past two weeks ( $r=.321$ ,  $p<.001$ ), and alcohol-related consequences ( $r=.406$ ,  $p<.001$ ). The fact that peer nominations for problem drinking was positively correlated with all three measures at a moderate level supports the hypothesis that students can in fact recognize problem drinkers within their social networks. The strongest correlation was between nominations and alcohol-related consequences, which was expected, because students were asked not who drinks the most, but “who loses control or causes problems for herself or others while drinking.” Nominations for problem drinking were also negatively correlated with the use of protective

behavioral strategies ( $r=-.174$ ,  $p=.018$ ), further suggesting that students can accurately perceive not just alcohol use, but harmful patterns of use in their peers.

Table 4.2

*Correlations Among Alcohol Use Measures and Problem Drinker Nominations*

	Prob. Drinker Nom.	Alcohol Consequences	Drinks/week	Max. BAC	"Binge" Episodes	Prot. Behav. Strat.
Prob. Drinker Nom.	1	.406**	.303**	.338**	.321**	-.174*
Alcohol Consequences	.406**	1	.545**	.561**	.502**	-.278**
Drinks/week	.303**	.545**	1	.541**	.599**	-.341**
Max. BAC	.338**	.561**	.541**	1	.495**	-.261**
"Binge" Episodes	.321**	.502**	.599**	.495**	1	-.304**
Prot. Behav. Strat.	-.174*	-.278**	-.341**	-.261**	-.304**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

To better understand these relationships, I constructed a series of multiple linear regression models. Problem drinker nominations was the dependent variable, with the alcohol use behaviors as the primary predictor variables and several other potentially pertinent variables were enlisted as controls (age, gender, GPA, level of attendance of organization functions, proportion of friends who are in the organization). Some of the alcohol use measures are conceptually similar as well as statistically correlated, so only two were loaded into the regression models to avoid colinearity. The two variables used in the regressions are drinks per week and alcohol-related consequences. They are related yet conceptually distinct from one another in that one measures quantity whereas the other measures alcohol-related harm. Because the variables examined have different scales and scoring, the standardized coefficients ( $\beta$ ) are reported. The results of the full model are reported below in Table 4.3.

Table 4.3

*Results of Regression Exploring Alcohol Use Measures and Controls on Problem Drinker Nominations*

<u>Independent Variables</u>	<u>Standardized Coefficient (<math>\beta</math>)</u>	<u>p value</u>
Age	0.118	0.082

Gender	0.003	0.971
GPA	-0.273	<.001
Org. Function Attendance	0.003	0.969
Close Friends in Org.	0.066	0.320
Alcohol Consequences	0.282	<.001
Drinks/week	0.111	0.165
R <sup>2</sup>	0.246	<.001

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The results of the regression indicated the predictors explained 24.6% of the variance ( $R^2=.246$ ,  $F(7,182)=8.46$ ,  $p<.001$ ). These results suggest that, even when controlling for other factors, students' perception of which of their fellows are problem drinkers is driven primarily by the alcohol consequences experienced by those students ( $\beta=.282$ ,  $p<.001$ ). Interestingly, the negative relation of GPA to problem drinker nominations is also significant ( $\beta=-.273$ ,  $p<.001$ ). Possible explanations for this are provided in the discussion.

## **Question 2: How do different measures of status correlate to drinking behaviors?**

Status was operationalized in a number of different ways in the present study. A goal of this exploratory analysis was to understand different conceptualizations of status in college student friend networks and what relationships those different conceptualizations have to drinking behaviors. The following items were explored as potential representations of "status": friendship nominations, nominations for "who is fun to be around in a drinking/party setting" (hereafter referred to as "drinking buddy nominations"), nominations for "who do you look up to or admire" (hereafter referred to as "admire nominations"), friendship reciprocity, whether or not a participant has held a leadership position in the fraternity/sorority. Friendship reciprocity was operationalized as the proportion of the actors a participant names as a friend who reciprocate and name that participant as a friend as well. The

leadership position variable was coded as either 1 (if the participant has held a leadership position in the organization) or 0 (if the participant has never held a leadership position). Descriptive statistics for these variables are presented in Table 4.4. Membership length was measured on a scale ranging from “less than 1 semester” to “more than 5 semesters.”

Table 4.4

*Descriptive Statistics for Status Measures*

	N	Minimum	Maximum	Mean	Std. Deviation
Friendship Nom.	192	.03	.86	.2468	.14632
Drnk. Buddy Nom.	192	.00	.88	.2529	.17551
Admire Nom.	192	.00	.67	.1514	.14050
Friendship Reciprocity	192	.00	1.00	.6443	.27911
Leadership Pos.	200	0	1	.48	.501
Membership Length	197	1	4	1.98	.992

The first step was to analyze the correlations between the status variables and alcohol use measures. A correlation matrix that includes the status variables, alcohol use measures, and problem drinker nominations is presented in Table 4.5. Nominations for non-problem drinkers is also included.

Table 4.5

*Correlations among Status Variables, Alcohol Measures, and Problem Drinker Nominations*

	Friendship Nom.	Drnk. Buddy Nom.	Admire Nom.	Membership Length	Leadership Pos.	Friendship Reciprocity	Prob. Drinker Nom.	Non-Prob. Drinker Nom.	Alcohol Consequences	Drinks/week
Friendship Nom.	1	.698**	.437**	-.011	.182*	.382**	.023	.299**	.175*	.359**
Drnk. Buddy Nom.	.698**	1	.276**	-.089	.099	.285**	.126	.130	.260**	.334**
Admire Nom.	.437**	.276**	1	.400**	.448**	.260**	-.175*	.435**	-.075	.068
Membership Length	-.011	-.089	.400**	1	.559**	.120	.110	-.074	.050	.124
Leadership Pos.	.182*	.099	.448**	.559**	1	.150*	.060	.087	-.047	.082
Friendship Reciprocity	.382**	.285**	.260**	.120	.150*	1	-.042	.075	.133	.100
Prob. Drinker Nom.	.023	.126	-.175*	.110	.060	-.042	1	-.678**	.406**	.303**
Non-Prob. Drinker Nom.	.299**	.130	.435**	-.074	.087	.075	-.678**	1	-.364**	-.174*
Alcohol Consequences	.175*	.260**	-.075	.050	-.047	.133	.406**	-.364**	1	.545**
Drinks/week	.359**	.334**	.068	.124	.082	.100	.303**	-.174*	.545**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

The table indicates correlations between many of the status variables. The strongest correlation is between friendship nominations and drinking buddy nominations ( $r=.698$ ,  $p<.001$ ), though friendship

nominations and admire nominations are also moderately correlated ( $r=.437$ ,  $p<.001$ ). Alcohol consequences and drinks per week are also positively correlated with friendship nominations ( $r=.175$ ,  $p=.015$ ;  $r=.359$ ,  $p<.001$ , respectively). These two findings would seem to suggest that drinking is correlated with popularity. The correlation with alcohol consequences is weaker, however. Previous studies have suggested that measures of alcohol use correlate with popularity or status because those measures indicate a greater sociability, and it is that sociability, not drinking itself, that drives the relationship (Reifman, 2003; Fondacaro, 1983). This idea is also supported by the fact that non-problem drinker nominations are much more strongly correlated to friendship nominations than problem drinker nominations ( $r=.299$ ,  $p<.001$ ;  $r=.023$ ,  $p=.750$ , respectively). The fact that both are correlated to friendship nominations in the same direction (both positive) seems paradoxical. However, it is possible that participants are more likely to nominate those that they know well (friends) as both problem or non-problem drinkers, compared to others in the organization with whom they may have little or no interaction. Hence, some of this correlation may be a result of familiarity.

Drinking buddy nominations are also positively correlated with alcohol consequences and drinks/week ( $r=.260$ ,  $p<.001$ ;  $r=.334$ ,  $p<.001$ , respectively), though the relationship with the use variable is stronger than the consequences variable. Neither problem nor non-problem drinker nominations are significantly related.

Though admire nominations are positively related to both friendship and drinking buddy nominations ( $r=.437$ ,  $p<.001$ ;  $r=.276$ ,  $p<.001$ , respectively), the differing relationships with alcohol variables suggests it represents a different type of status. Unlike the others, it is negatively related to both problem drinker nominations ( $r=-.175$ ,  $p=.015$ ) and alcohol consequences (though the consequences relationship is non-significant-  $r=-.075$ ,  $p=.301$ ). The  $r$  value for non-problem drinker nominations is greater than any other status measure ( $r=.435$ ,  $p<.001$ ). Also, the admire nominations variable, unlike the other nomination variables, has significant associations to membership length and leadership positions ( $r=.448$ ,  $p<.001$ ;  $r=.400$ ,  $p<.001$ , respectively).



Unsurprisingly, membership length and leadership positions are positively correlated ( $r=.559$ ,  $p<.001$ ). Friendship reciprocity did not have significant associations with any alcohol measures or the problem/non-problem nominations.

To further explore this research question 2, the status variables were used as outcome variables in multiple linear regression models. The most pertinent predictor variables are drinking behaviors (drinks per week, alcohol-related consequences). Other variables were entered into the model to control for any factors that could theoretically have an effect on status within the group (organizational function attendance, close friends in organization, gender, age, GPA).

The results of the regressions exploring status are presented below in Table 4.6.

Table 4.6

*Results of Regressions Exploring Alcohol Use Measures and Controls on Various Status Indicators*

<u>Independent Variables</u>	Friend- ship Nom.	Friendship (Drinks/ wk nonlinear)	Friendship (Alc. Consq. nonlinear)	Drinking Buddy Nom.	Admire Nom.	Leadr- ship Pos.
Age	0.03	0.01	0.06	-0.03	0.36 ***	0.37 ***
Gender	-0.32 ***	-0.09 ***	-0.36 ***	-0.05	-0.14 *	0.02
GPA	0.03	0.01	0.05	-0.06	0.13	0.02
Org. Function Attendance	0.07	0.01	0.07	0.08	0.00	0.04
Close Friends in Org.	0.04	0.01	0.04	0.01	0.13 +	0.03
Alcohol Consequences	0.04		0.55 **	0.11	-0.09	-0.09
Drinks/week	0.28 ***	0.01 ***		0.26 **	0.06	0.11
Alcohol Consequences <sup>2</sup>			-0.38 +			
Drinks/week <sup>2</sup>		0.00 **				
R <sup>2</sup> (adjusted)	0.23 ***	0.27 ***	0.16 ***	0.13 ***	0.22 ***	0.16 ***

+  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Note. Entries represent standardized betas.

***Friendship nominations.***

The friendship nominations variable was used as the dependent variable in the first regression model. The results of the regression indicated the predictors explained 22.8% of the variance ( $R^2=.23$ ,

$F(7,182)=7.70, p<.001$ ). Gender is a significant factor ( $\beta=-.32, p<.001$ ), suggesting that the men in the sample nominated fewer friends than the women (and therefore had less friendship nominations). Drinks per week had the next-largest significant effect and was positively related to friendship nominations ( $\beta=.28, p<.001$ ). Alcohol consequences was not significant in the model, though the relationship was positive. The model supports the idea that drinking more is related to more friendship nominations, but that the same is not true of harmful drinking.

I also tested to see if the drinking variables had a curvilinear relationship with friendship nominations. In other words, though the overall relationship between drinks per week and friendship nominations is positive, is there a point of diminishing returns? To test this idea, I constructed the same regression, but isolated drinks per week as the only alcohol variable and included drinks per week squared as another predictor variable. The results are shown in Table 4.6.

The results of this regression indicated that this set of predictors explained 26.8% of the variance in friendship nominations ( $R^2=.27, F(7,182)=9.5, p<.001$ ). The fact that both drinks/week and drinks/wk<sup>2</sup> are significant and related in opposite directions indicates a nonlinear relationship ( $\beta=.01, p<.001$ ;  $\beta=.000149, p=.002$ ). In other words drinks per week is positively related to friendship nominations, but that positive effect decreases at higher levels of drinks per week and eventually becomes negative. Applying the standard quadratic equation, the maximum for drinks per week (or the point beyond which the relationship becomes negative) is 36.91 drinks/week. So the greatest gains in friendship nominations result from increases at lower levels of drinks per week and increases beyond 36.91 drinks per week result in fewer friendship nominations.

I applied the same process to alcohol consequences. The results of the regression including alcohol consequences and the squared term indicated that this set of predictors explained 19.2% of the variance in friendship nominations ( $R^2=.19, F(7,183)=6.22, p<.001$ ). Alcohol consequences is positively related ( $\beta=.55, p=.011$ ) and the squared term is negatively related ( $\beta=-.38, p=.079$ ). The squared term is only significant at  $p<.10$ , but this result supports a nonlinear relationship similar to the one for

drinks/week described above. Therefore the positive effect of alcohol consequences on friendship nominations also decreases as alcohol consequences increase, eventually becoming negative. The maximum, or point beyond which increases in alcohol consequences result in a decrease in friendship nominations is a score of 8.48 on the consequences scale.

As a means of comparison, the maximum point of drinks per week (36.91) is over 2 standard deviations above the mean for that variable. However the maximum point for alcohol consequences (8.48) is less than one half of one standard deviation above the mean. So the point at which increasing quantity of drinks per week switches from being socially rewarded to incurring a social cost is rather extreme, whereas that same point for alcohol consequences is much more moderate. These findings support the hypothesis that the positive relationship found in previous studies between alcohol use and popularity might not hold true for more extreme levels of use.

### ***Drinking buddy nominations.***

The same linear regression procedure was used with drinking buddy nominations as the dependent variable. In this regression, results indicated that the predictors explained 13.3% of the variance ( $R^2=.13$ ,  $F(7,182)=3.99$ ,  $p<.001$ ). Drinks per week is significant and positively related ( $\beta=.26$ ,  $p=.003$ ), suggesting that students who drink more receive more drinking buddy nominations, even when controlling for other factors. Once again alcohol consequences was not found significant. The results of the full regression are presented in Table 4.6 above. The initial hypothesis was that this variable would be more positively related to the alcohol variables than other status types. Although that appears to be supported, it is interesting that alcohol consequences was not a significant predictor in this model.

### ***Admire nominations.***

The same model, used with admire nominations is also presented in Table 4.6. The results of this regression indicated that the predictors explained 22.2% of the variance in admire nominations ( $R^2=.22$ ,  $F(7,182)=7.42$ ,  $p<.001$ ). Age had the strongest significant association to admire nominations ( $\beta=.36$ ,  $p<.001$ ). GPA was positively associated as well ( $\beta=.13$ ,  $p=.063$ ) and gender was once again negatively associated ( $\beta=-.14$ ,  $p=.046$ ). Unlike the previous two status measures, drinks per week is not significant in this regression and alcohol consequences is actually negatively related (though also not significant). These results support the hypothesis that admire nominations would be less positively related to alcohol variables than friendship or drinking buddy nominations.

### ***Leadership positions.***

The same regression was used to explain the variance in the leadership position variable. The results indicated that the predictors explained 16.3% of the variance in leadership positions ( $R^2=.16$ ,  $F(7,190)=5.30$ ,  $p<.001$ ). This model yielded age as the only significant variable ( $\beta=.37$ ,  $p<.001$ ). Like admire nominations drinks per week is positive but not significant and alcohol consequences is negative but not significant. This also supports the hypothesis that leadership positions, like admire nominations, represent a different type of status that would be less positively related to drinking variables than other status measures.

### ***Exploring problem drinker nominations in relation to alcohol consequences.***

The ways in which problem and non-problem drinker nominations are distinct from alcohol consequences was also examined. Though the two are sufficiently related to answer the first research question above, it is important to consider the difference between self-report consequences and the

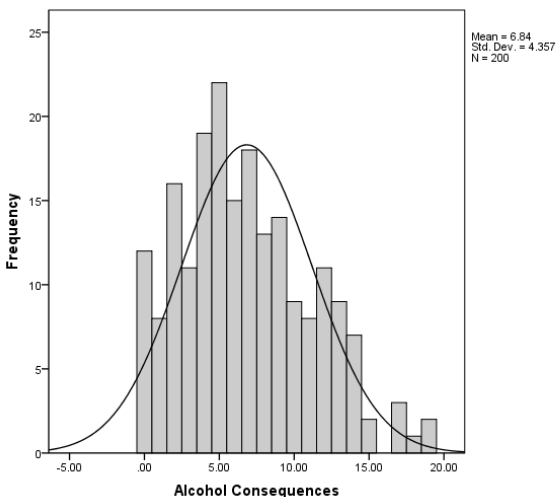
“reputational” variables included in this study. A first step is to examine the variables themselves. The descriptive statistics for all three are included in Table 4.7 below. Friendship nominations is also included in this section to provide a means of comparing problem and non-problem drinker nominations to other nomination variables.

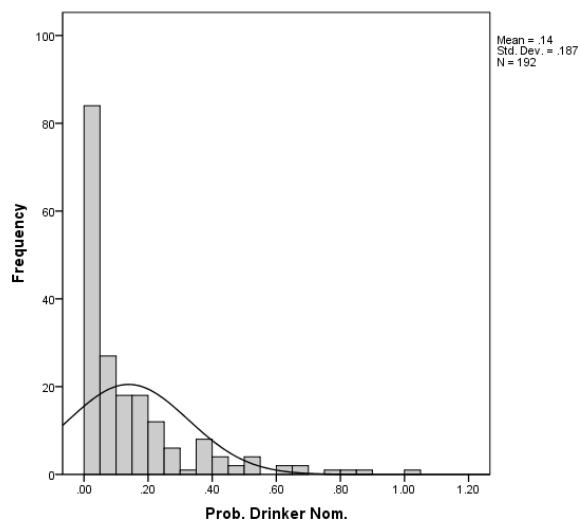
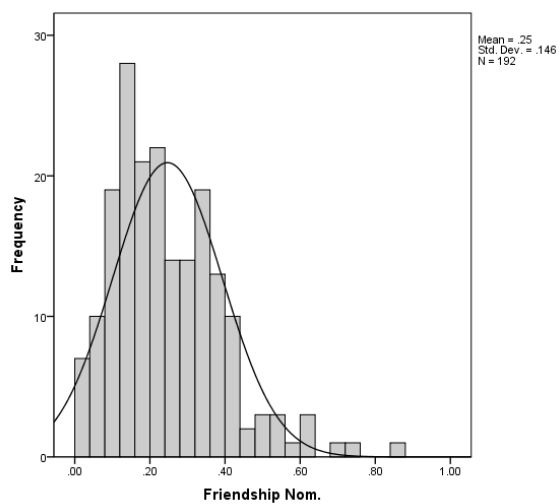
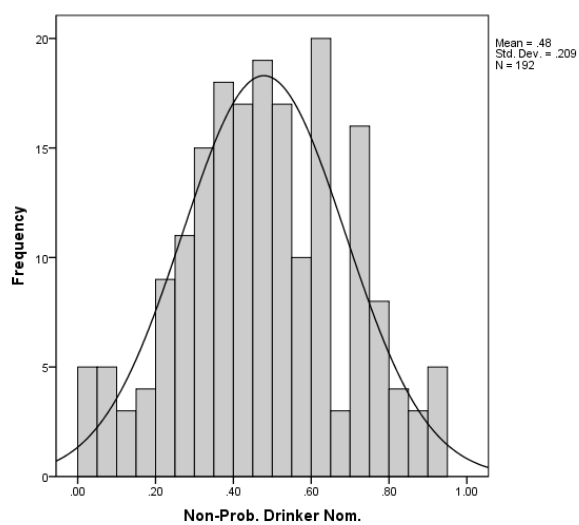
Table 4.7

*Descriptive Statistics of Alcohol Consequences, Problem & Non-problem Drinker Nominations, and Friendship Nominations*

	N	Minimum	Maximum	Mean	Std. Deviation
Alcohol Consequences	200	.00	19.00	6.8350	4.35691
Prob. Drinker Nom.	192	.00	1.00	.1390	.18678
Non-Prob. Drinker Nom.	192	.03	.94	.4784	.20926
Friendship Nom.	192	.03	.86	.2468	.14632

From the table, it can be seen that problem drinker nominations has a maximum of 1, as opposed to friendship nominations which has a maximum at .86, yet the mean is lower (.139 as opposed to .247). A visual representation of the distribution of each variable is further illuminating. Figure 4.1 presents the histograms of the four variables.





*Figure 4.1.* Histograms for Alcohol Consequences, Friendship Nominations, Non-Problem Drinker Nominations, and Problem Drinker Nominations.

Three of the four variables appear fairly normally distributed, but Problem Drinker Nominations is very positively skewed. The figure shows that the majority of participants have a problem drinker nomination score of less than .20, yet several score over .60, with one case at 1.0. A score of 1.0 means that 100% of organization members nominated that particular participant as a problem drinker.

To better illustrate the uniqueness of problem drinker nominations, I selected four of the eight organizations in the study and graphed the friendship nominations, problem drinker nominations, and alcohol consequences score of each participant in the organization, shown in Figures 4.2, 4.3, 4.4, and 4.5. Raw number of nominations is used instead of normalized score and because of this it is important to note the scale of the y-axis, particularly when paying attention to consequences score. In each figure, participants have been sorted by their problem drinker nominations (largest to smallest) for readability.

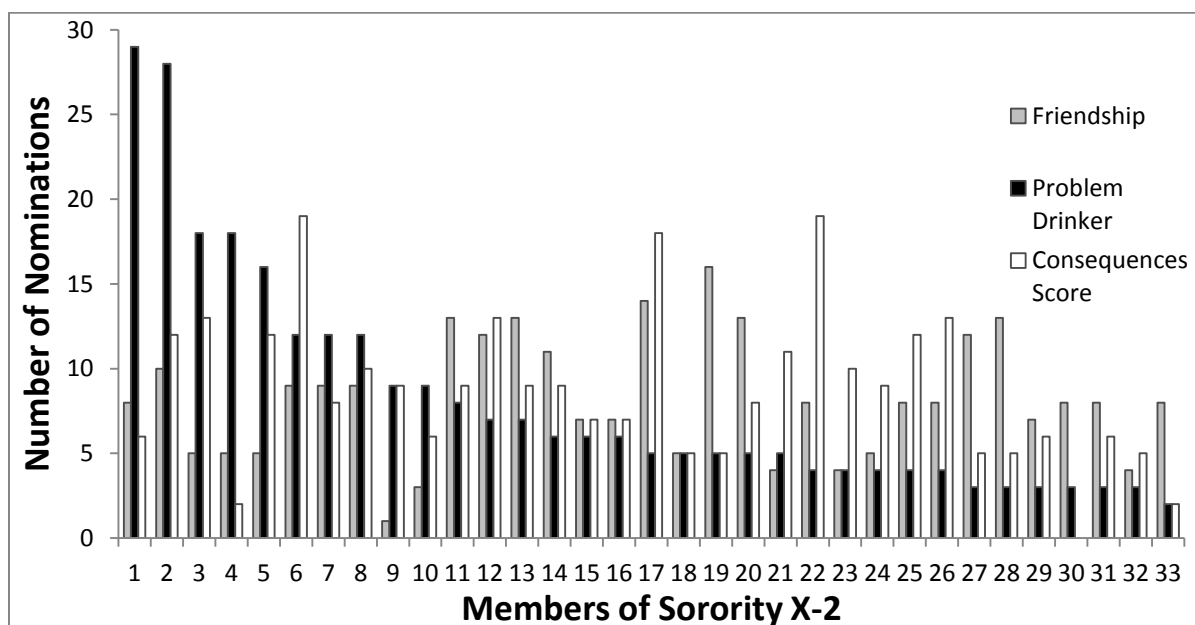


Figure 4.2. Friendship Nominations, Problem Drinker Nominations, and Consequences Score for Sorority 2 (ordered left to right by descending problem drinker nominations).

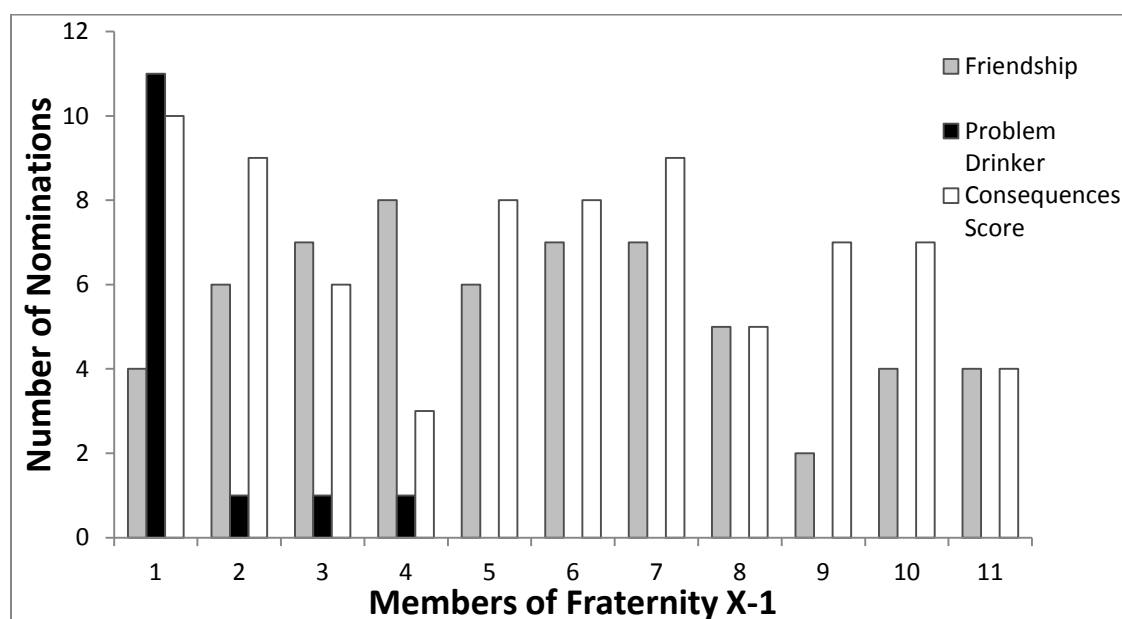


Figure 4.3. Friendship Nominations, Problem Drinker Nominations, and Consequences Score for Fraternity 1 (ordered left to right by descending problem drinker nominations).



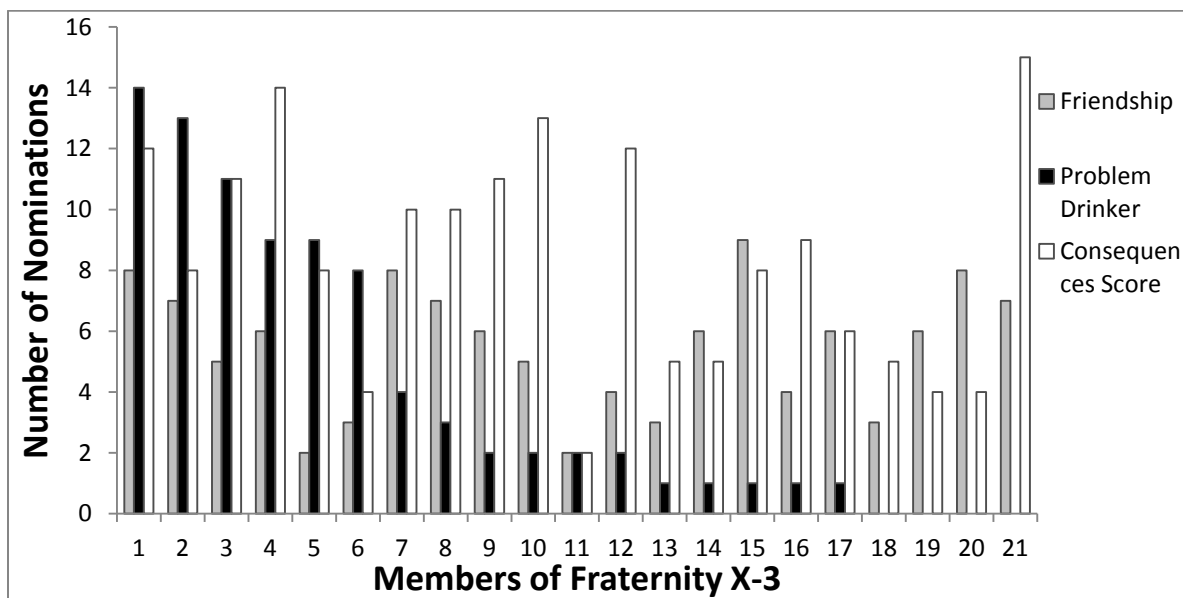


Figure 4.4. Friendship Nominations, Problem Drinker Nominations, and Consequences Score for Fraternity 3 (ordered left to right by descending problem drinker nominations).

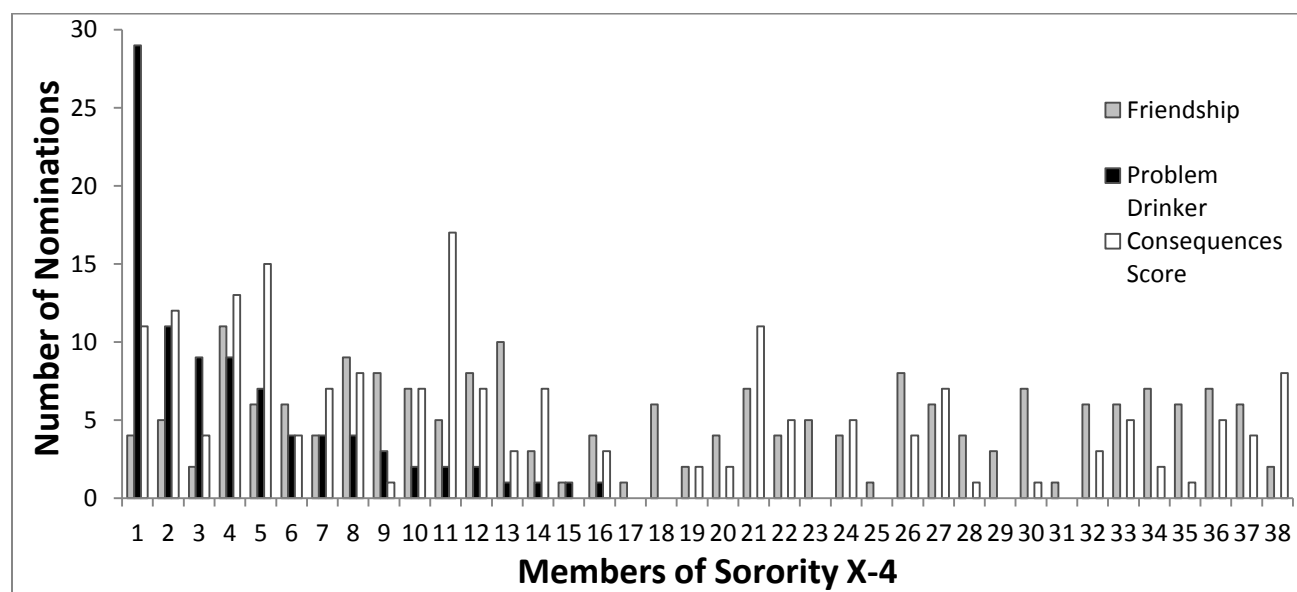


Figure 4.5. Friendship Nominations, Problem Drinker Nominations, and Consequences Score for Sorority 4 (ordered left to right by descending problem drinker nominations).

The weak correlation between problem drinker nominations and alcohol consequences score is visible in the figures. In figure 4.3, the participant with the highest consequences score also had the greatest number of problem drinker nominations. However in figure 4.4 the participant with the highest

consequences score received 0 problem drinker nominations. In each of the four figures, the highest number of problem drinker nominations exceeds the greatest number of friendship nominations. Problem drinker nominations are highly concentrated on a few individuals, with the majority of organization members receiving few nominations or none at all. The figures show that 1-2 individuals per organization received problem drinker nominations from a majority of their peers, a remarkable level of agreement.

Because consequences and problem nominations are distinct in this way, I examined the effect of supplanting the self-report drinking behaviors with the reputational variables on friendship nominations and admire nominations. The results are presented in Table 4.8.

Table 4.8

*Results of Regression Exploring Problem and Non-Problem  
Drinker Nominations and Controls on Friendship Nominations*

<u>Independent Variables</u>	<u>Standardized Coefficient (<math>\beta</math>)</u>	<u>p value</u>
Age	0.046	0.493
Gender	-0.257	<.001
GPA	-0.049	0.488
Org. Function Attendance	0.069	0.289
Close Friends in Org.	0.062	0.348
Problem Drinker Nominations	0.336	<.001
Non-Problem Drinker Nominations	0.491	<.001
R <sup>2</sup> (adjusted)	0.230	<.001

In comparison to the model reported in table 4.6, which uses drinks/week and alcohol consequences, the model using problem and non-problem nominations instead predicts more of the variance ( $R^2=.230$ , as opposed to  $R^2=.199$  in the previous model). Both nominations variables are stronger predictors of friendship nominations than any other variables in either model (problem drinker nominations  $\beta=.366$ ,  $p<.001$ ; non-problem drinker nominations  $\beta=.491$ ,  $p<.001$ ). They are once again related in the same direction.

Replacing the self-report variables with problem and non-problem drinker nominations in a regression predicting admire nominations yields similar results. The same model used with admire nominations predicts more of the variance ( $R^2=.354$ ; previous model  $R^2= .192$ ). Non-problem nominations are once again the most powerful predictor variable ( $\beta=.517$ ,  $p<.001$ ). The full results are reported in table 4.9 below.

Table 4.9

*Results of Regression Exploring Problem and Non-Problem  
Drinker Nominations and Controls on Admire Nominations*

<u>Independent Variables</u>	<u>Standardized Coefficient (<math>\beta</math>)</u>	<u>p value</u>
Age	0.366	<.001
Gender	-0.035	0.572
GPA	0.030	0.643
Org. Function Attendance	0.006	0.914
Close Friends in Org.	0.134	0.027
Problem Drinker Nominations	0.134	0.112
Non-Problem Drinker Nominations	0.517	<.001
$R^2$ (adjusted)	0.354	<.001

Problem drinker nominations is also dissimilar from alcohol consequences in its relationship to GPA. The unique link between problem drinker nominations and GPA is evident in table 4.10, which shows the correlations between GPA, problem and non-problem drinker nominations, and the alcohol use variables in the study.

Table 4.10

*Correlations among GPA, Problem & Non-Problem Nominations, and Alcohol Measures*

	GPA	Prob. Drinker Nom.	Non-Prob. Drinker Nom.	Alcohol Consequen ces	Drinks/week	Max. BAC	Prot. Behav. Strat.
GPA	1	-.304**	.301**	-.192**	-.075	-.069	.010
Prob. Drinker Nom.	-.304**	1	-.678**	.406**	.303**	.338**	-.174*
Non-Prob. Drinker Nom.	.301**	-.678**	1	-.364**	-.174*	-.294**	.158*
Alcohol Consequences	-.192**	.406**	-.364**	1	.545**	.561**	-.278**
Drinks/week	-.075	.303**	-.174*	.545**	1	.541**	-.341**
Max. BAC	-.069	.338**	-.294**	.561**	.541**	1	-.261**
Prot. Behav. Strat.	.010	-.174*	.158*	-.278**	-.341**	-.261**	1

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

As can be seen from the table, 3 of the 4 self-report alcohol measures have no significant correlation to GPA. Alcohol consequences has a significant negative correlation, but both problem and non-problem drinker nominations have a stronger correlation to GPA. If we attempt to predict GPA while controlling for other factors using the variables in the study, we find similarly that problem drinker nominations is the most influential predictor ( $\beta = -.298$ ,  $p < .001$ ). The full regression is presented in table 4.11 below. The fact that students' perceptions of which of their peers experiences alcohol-related harms is tied to such an important distal education outcome could have beneficial implications for future research and intervention.

Table 4.11

*Results of Regression Exploring Problem Drinker Nominations, Alcohol Measures, and Controls on GPA*

Independent Variables	Standardized Coefficient ( $\beta$ )	p value
Age	0.273	<.001
Gender	-0.014	0.841
Org. Function Attendance	-0.060	0.382
Close Friends in Org.	0.014	0.839
Alcohol Consequences	-0.080	0.353
Drinks/week	0.027	0.751
Problem Drinker Nominations	-0.298	<.001

$R^2$ (adjusted)	0.143	<.001
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**Question 3: What is the relationship between status, drinking behaviors, and willingness to intervene or express disapproval for drinking behaviors?**

Similar to the questions above, I constructed a multiple linear regression to better understand the relationship between status, drinking behaviors, and willingness to intervene or express disapproval for drinking behaviors. “Willingness to intervene” refers to a score given to a series of items intended to assess whether or not the participant would helpfully intervene as a friend or bystander in cases where another student was becoming dangerously intoxicated or causing problems for others. The Cronbach’s alpha for this scale was .714.

In addition to the control variables and alcohol use measures, the primary predictors theorized to potentially relate to willingness to intervene include: protective behavioral strategies, self-reported level of approval for dangerous drinking behaviors ( $\alpha=.783$ ), the self-reported importance of the approval of others in the organization (1 item), friendship nominations, admire nominations, and leadership positions.

The descriptive statistics for willingness to intervene, self-reported approval for drinking behaviors (“drinking behavior approval”), and self-reported importance of the approval of others in the organization (“approval importance”) are presented in table 4.12.

Table 4.12  
*Descriptive Statistics*

	N	Minimum	Maximum	Mean	Std. Deviation
Willingness to Intervene	200	16.00	35.00	26.7350	4.72083
Drinking Behavior Approval	199	10.00	48.00	23.3668	6.84763
Approval Importance	200	1	5	3.52	1.007
Valid N (listwise)	199				

The correlations between all variables described above are presented in Table 4.13. The table reveals that willingness to intervene is significantly correlated to age, protective behavioral strategies, drinking behavior approval, friendship nominations, admire nominations, and leadership positions. The strongest correlations with willingness to intervene involve protective behavioral strategies and leadership positions ( $r=.258, p<.001$ ;  $r=.249, p<.001$  respectively).

Table 4.13

*Willingness to Intervene Correlations*

	Willingness to Intervene	Age	Gender	GPA	Org. Function Attendance	Close Friends in Org.	Alcohol Consequences	Drinks/week	Prot. Behav. Strat.	Drinking Behavior Approval	Friendship Nom.	Admire Nom.	Leadership Pos.
Willingness to Intervene	1	.140*	-.129	-.092	.009	.002	.021	.082	.258**	-.140*	.165*	.156*	.249**
Age	.140*	1	.089	.381**	.049	.046	-.065	.052	-.034	-.082	.066	.399**	.390**
Gender	-.129	.089	1	.005	.114	.073	.006	-.183**	-.161*	-.100	-.360**	-.134	.034
GPA	-.092	.381**	.005	1	-.052	-.024	-.192**	-.075	.010	-.098	.009	.233**	.158*
Org. Function Attendance	.009	.049	.114	-.052	1	.174*	-.016	.032	-.097	.001	.019	.023	.042
Close Friends in Org.	.002	.046	.073	-.024	.174*	1	.109	.092	-.071	.136	.070	.140	.067
Alcohol Consequences	.021	-.065	.006	-.192**	-.016	.109	1	.545**	-.278**	.372**	.175*	-.075	-.047
Drinks/week	.082	.052	-.183**	-.075	.032	.092	.545**	1	-.341**	.386**	.359**	.068	.082
Prot. Behav. Strat.	.258**	-.034	-.161*	.010	-.097	-.071	-.278**	-.341**	1	-.235**	-.011	.012	-.002
Drinking Behavior Approval	-.140*	-.082	-.100	-.098	.001	.136	.372**	.386**	-.235**	1	.126	-.029	-.101
Friendship Nom.	.165*	.066	-.360**	.009	.019	.070	.175*	.359**	-.011	.126	1	.437**	.182*
Admire Nom.	.156*	.399**	-.134	.233**	.023	.140	-.075	.068	.012	-.029	.437**	1	.448**
Leadership Pos.	.249**	.390**	.034	.158*	.042	.067	-.047	.082	-.002	-.101	.182*	.448**	1

\* Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

To better understand these relationships, I constructed a multiple linear regression using the variables above along with several controls. The results are presented in Table 4.14.

Table 4.14

*Results of Regression Exploring Willingness to Intervene*

Independent Variables	Standardized Coefficient ( $\beta$ )	p value
Age	-0.106	0.201
Gender	-0.065	0.397
GPA	-0.176	0.016
Org. Function Attendance	0.031	0.657
Close Friends in Org.	-0.004	0.958
Alcohol Consequences	0.092	0.274
Drinks/week	0.169	0.067
Prot. Behav. Strat.	0.294	<.001

Drinking Behavior Approval	-0.151	0.058
Friendship Nom.	-0.013	0.884
Admire Nom.	0.085	0.352
Leadership Pos.	0.229	0.01
$R^2$ (adjusted)	0.161	<.001

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Even when loading all the theorized variables and controls into the model, Leadership position and protective behavioral strategies are the most influential predictors ( $\beta=.229$ ,  $p<.001$ ;  $\beta=.294$ ,  $p<.001$ ). Drinking behavior approval was negatively related ( $\beta=-.151$ ,  $p=.058$ ). However GPA was also negatively related ( $\beta=-.176$ ,  $p=.016$ ), which is a difficult finding to interpret. It is possible that students with lower GPA may spend more time in drinking/party settings or around peers that drink heavily and thus have more opportunities to intervene. Drinks per week is positively related ( $\beta=.169$ ,  $p=.067$ ). However the strength of protective strategies and leadership positions as predictors in this model supports the interpretation that students that use harm-reduction strategies themselves while drinking and that hold leadership positions are more likely to helpfully intervene to mitigate alcohol-related harms in others. It was hypothesized that status would predict willingness to intervene. The fact that leadership positions was the only status measure significantly related raises some important questions what elements of this type of status might account for its unique relationship to WTI. Some possible explanations are presented in the discussion.

## **Chapter 5**

### **Discussion**

This study was designed to afford a more comprehensive understanding of the social dynamics that affect alcohol use in college students. It was also designed to inform the development of effective interventions to reduce the harmful alcohol use among college students. The findings contribute new information to the understanding of the relationships among friendships, social status, and problem drinking. Furthermore, this new information seems to have some important implications for intervention development.

For college students, drinking is a socially-situated behavior; few drink alone (Lange, Johnson, & Reed, 2006). Previous research on social norms has shown that students tend to overestimate the alcohol use of their peers and that perceived peer use affects individual use (Borsari & Carey, 2001, 2003; Perkins & Craig, 2012). Links between alcohol use and popularity also have been established (Ennett et al., 2006; Moody et al., 2011; Reifman et al., 2006). These extant research findings suggest that students are blind to the consequences resulting from the alcohol use of their peers and that heavy drinking is socially rewarded. Although most researchers and practitioners would acknowledge that the issue is more complex, the design of certain interventions that address college student drinking seems to follow directly from these conclusions. One example of this type of thinking is the design of early interventions that sought to modify behavior by teaching students the risks and consequences of alcohol use (Correia et al., 2012). Social norms campaigns were created on the premise that if you present students with “correct” information on how much their peers drink, the power of students’ inherent overestimations will be diluted (Neighbors et al., 2007). Other recent approaches utilize some combination of education and motivational enhancement, usually delivered individually outside the social context in which drinking occurs (Dejong et al., 2009). The hope for these individual interventions is that they create enough



awareness and motivation to overcome whatever social forces exist within peer networks that promote and reward problematic alcohol use. Interventions that attempt to teach students skills like drink refusal are perhaps the most explicit example of this (Hustad et al., 2009).

Part of the motivation for the present study was to problematize this conventional wisdom by imagining that peer relationships and social pressures could be an essential part of the solution, rather than solely a problem to be overcome. The following questions ensued: Can we change what happens at the party to create an environment more conducive to safety and moderation? Can we enhance whatever awareness of alcohol-related harms that might already exist within students and encourage greater communication of that within social groups? These questions lead to certain hypotheses. First, if students do in fact recognize peers who may be problem drinkers, they not only become a valuable source of referral to services, but could also then be taught ways to intervene helpfully. Second, if certain types of extreme drinking behaviors carry a social cost, rather than social reward, then perhaps greater awareness of those phenomena could present a powerful motivation to adopt more moderate use.

Some interventions already seek to leverage the influence of peers in reducing the harms associated with drinking, though evidence of their efficacy is mixed. This category of interventions includes social norms marketing and peer education programs (Correia et al., 2012). These interventions face certain challenges. Peer education approaches rely on a small set of students trained to deliver interventions to the entire campus. For the students attending these peer-lead interventions, they may not identify with peer educators who are not embedded in their immediate social network. This may be one reason that some peer education approaches were found to demonstrate “evidence of ineffectiveness” when used in isolation (Dejong et al., 2009). Social norms approaches often utilize comparisons to less immediate, theoretical groups (e.g. “the average student”), which have been found to decrease the efficacy of this approach (Neighbors et al., 2007).

It may be possible to develop interventions that use the power of peers, but also overcome some of these obstacles. However before we can design interventions that draw on students’ relationships and

social dynamics as part of the solution, some essential questions must be answered. This study set out to take a small but important step toward answering these questions and aiding the design of effective interventions.

### **Contributions to theory**

One of the primary theoretical frameworks for this study was Bronfenbrenner's (1975) ecological model, which suggests that the ecologies of influence around an individual matter: the persons, systems, and institution with whom that individual interacts. This study was focused at the level of the microsystem (individuals and institutions with whom one has direct contact). It hypothesizes that not only does the group of individuals in a social network matter, but also one's unique position within that network can affect and be affected by individual behavior. The present study measured different conceptions of social position and relative status among peers, and the results suggest that these different conceptions bear quantitatively differing relationships to individual drinking behaviors. These differing relationships represent an important contribution to the ecological model in that they suggest that the influence of a set group of peers is not monolithic. Rather relative status and how one is thought of by peers (as a friend, someone to admire, a problem drinker) could affect and be affected by individual behavior in different ways.

Additionally the study meaningfully contributes to the understanding of Bandura's (1977) Social Learning Theory (SLT), and in particular theoretical conceptions of social norms. Previous research has demonstrated that students misperceive the descriptive norms among their peers, overestimating how much others are drinking (Borsari & Carey, 2003). This line of research has shown that these misperceptions lead to increased individual use. The present study contributes uniquely to research on injunctive social norms. Where descriptive norms are made up of how much peers engage in a behavior, injunctive norms are about how much peers approve of or endorse certain behaviors. By

demonstrating a tipping point, beyond which problem drinking detrimentally affects friendship relationships within a social network, this study shows some evidence of injunctive norms at work. This same finding also informs Kelman's (1958) theory of social influence processes, which describes three processes of social influence: compliance, identification, and internalization. Drinking is a social act for most college students so the process of identification, which stems from the basic human desire to create meaningful social relationships with others, is perhaps the most salient form of social influence with regard to student alcohol behavior (as opposed to compliance or internalization). The findings in the current study suggest that social relationships could be harmed by problematic drinking, so it is possible that greater knowledge of this among students could positively influence institutional efforts to reduce problematic drinking through this process of identification.

### **Students can recognize problem drinkers in their social networks**

In order to imagine that students can have a positive, harm-reducing effect on their friends, it is important to know whether students can accurately perceive alcohol-related harms in members of their immediate social networks.

Students in this study were asked to nominate members of their social networks as problem drinkers (specifically, "who loses control, or causes problems for himself/herself or others while drinking?"). It is important to assess the accuracy of these nominations, as they could be based in an unfair reputation or other confounding factors, rather than the actual drinking behavior (and resultant harms) of the nominated individual. Examining self-other agreement is an established method to understand the accuracy of perceptions, using both data sources as corroboration (Kenny, 1994).

Although it would be ideal to compare the perception to some objective measure, a great deal of research into college student alcohol use relies on self-report data and a number of studies have evaluated self-report against objective measures and report a favorable level of accuracy (Dowdall & Wechsler, 2002).

This study measures self-report data on alcohol use and alcohol-related consequences against problem drinker nominations.

Based on this limited sample, it appears that students can recognize problem drinking in their peers. Specifically, this study found that problem drinker nominations correlated to alcohol use behaviors (such as drinks per week, maximum BAC in the past month, number of “binge” drinking episodes). Nominations were also negatively correlated to the use of protective behavioral strategies. Perhaps most importantly, the strongest correlation was to self-reported alcohol-related consequences and the strength of this relationship persisted when controlling for other variables. Though this is not a comparison to an objective measure, the correlation with a second source of data, which in this case is self-report, suggests a level of accuracy of peer perceptions.

The fact that the strongest relationship is with self-reported alcohol consequences, rather than other variables like drinks per week, is a strong testament to the nature of these peer perceptions. Students could easily look around and perceive who drinks often, or consumes in higher quantities when drinking. It wouldn't be surprising if that had the strongest association. However students were asked specifically “who... causes problems for himself/herself or others while drinking,” and the fact that they discerned problems over the “noise” of quantity/frequency is noteworthy. Problem drinker nominations also demonstrated a negative relationship with protective behaviors. Protective behaviors are actions like monitoring how many drinks you are having, or determining to stop drinking at a certain time. Using these strategies allows one to reduce the harms from drinking, or drink in a less problematic way. So students using these strategies are less likely to be nominated as a problem drinker by peers, which further suggests that a particular type of problem drinking drives the nominations, rather than other factors.

The suggestions in the data of this accuracy gave rise to questions about the ways in which problem drinker nominations and alcohol consequences score are conceptually distinct. The two variables have a strong but imperfect relationship, so what should we make of the “noise” in the relationship between them? One possibility is that students are misperceiving the problem drinking of

their peers. Another possibility is that these peer perceptions are capturing harms that are qualitatively different or missed by the self-report measure. Indeed it is possible that the perceptions of peers might be more accurate than self-report. For example a student may wake up and feel that he had been “not that drunk” the night before, while peers could have observed that same person doing or saying embarrassing things, having verbal altercations with friends, or engaging in other problematic behaviors. Though self-report measures of college student alcohol use have been shown to be relatively stable and reliable (Dowdall & Wechsler, 2002), they are certainly not immune to social desirability and other biases (Christiansen et al., 2002).

One of the first clues that these differences might be important was the strength of GPA in predicting problem drinker nominations; the negative relationship with GPA as nearly as strong as the positive relationship with alcohol consequences. It is difficult to speculate on what is behind the association between GPA and the peer nominations. It is possible that peers are able to see alcohol-related harms that influence overall achievement more effectively than self-report measures. It is also possible that peers are biased by academic success and more likely to think of lower achieving students as problem drinkers, even if the reasons for the lower achievement are not alcohol-related. However, GPA is an important measure of collegiate success so the fact that these peer nominations are related in a way that self-reported alcohol consequences are not certainly makes this variable worthy of further investigation. After all, colleges and universities dedicate resources to combatting dangerous drinking in part because of the negative impact it can have on student persistence and achievement.

Another intriguing characteristic of problem drinker nominations in this study is the level of agreement. The range for problem drinker nominations was greater than all other nomination variables and the most-nominated participants in each of the eight participating organizations received nominations from 41-100% of members. This is especially striking when considering that over 75% of participants received nominations from 19% of their peers or less. The most common problem-drinker nomination score was zero. In other words, the vast majority of participants received little to no nominations at all.

However there exists a small subset of students in the study that were named a problem drinker by a large proportion of their peers. The fact that there are certain individuals who such a sizable percentage of peers recognize as problematic drinkers presents ripe opportunities for future research and intervention.

First, it would be interesting to investigate what these individuals have in common. Are there certain consequences or alcohol-related behaviors that are particularly noticeable to peers, or viewed as particularly problematic? It is possible that the peers are recognizing something profound about these highly-nominated students. Although the vast majority of college students “mature out” of dangerous drinking behaviors as they move through and beyond college, some do not (Schulenberg et al., 2001; Sher et al., 2001). It is possible that when so many peers agree that a person is a particularly problematic drinker, they might be recognizing an addiction or dependence issue.

These nominations could also represent a powerful referral source. Not only is it possible, as suggested in the preceding paragraph, that peers might be perceiving grave problems, but they may also recognize an issue before the problem drinker him or herself. What would happen if the targets of these nominations knew that peers felt their drinking was problematic? Would that help spur self-awareness and help seeking? Also, would students be more likely to intervene or suggest a peer seek help if they knew that others also recognized a problem? It is entirely possible that members of a fraternity or sorority might not have those kinds of conversations, or think deeply about the implications of their fellows’ behavior, unless specifically prompted like they were in this study.

### **Drinking and Social Status**

Previous studies suggest that drinking is socially rewarded and associated with social status or popularity (Ennett et al., 2006; Moody et al., 2011; Reifman et al., 2006). This study seeks to understand if this is a direct, linear relationship that holds true without condition, or if certain drinking behaviors that cause problems for self or others actually carry a social cost. Qualitative research has shown that students

actually disapprove of certain drinking behaviors (most notably losing control, causing problems for others, or drinking for the “wrong reasons”), but this has yet to be shown quantitatively (Caboni et al., 2005; Demant & Järvinen, 2011; Lederman & Stewart, 2005). So does it hold true that the more you drink, the more popular you are? Or is there instead a limit?

The short answer is yes- in this sample there appears to be a tipping point and there appears to be some social costs related to problematic drinking. Alcohol-related problems, not drinking quantity appear to be the key factor in the relationship to status. This is perhaps unsurprising because students were asked about problematic use, not who drinks the most. Also, it is unlikely that students are counting how much others are drinking or closely monitoring quantity, whereas alcohol-related problems like vomiting or getting into trouble with college authorities are more visible. The results of these analyses of status suggest that drinking excessively is socially detrimental only at very extreme levels, whereas being a problematic drinker seems to incur social cost at much lower levels. Drinks per week showed a negative relationship to friendship nominations beyond two standard deviations above the mean. Alcohol consequences, on the other hand were assessed as detrimental just before they reached one half of one standard deviation above the mean. In addition, having higher consequences had a negative relationship to certain status measures at all levels (discussed in more detail below). Being thought of as a “non-problem” drinker was positively related to some status measures, whereas being nominated as a problem drinker had only negative or non-significant associations with status.

This study conceptualized status as multifaceted, so it is operationalized in a number of ways. Conditions or attributes like being nominated as a friend, someone to admire, or someone fun to be around in a party/drinking setting could each represent a different desirable type of status for college students. Leadership positions were also examined as another type of positive peer recognition.

Friendship is the central network variable in the study. The impact of friends on individual drinking behavior is well-established (Borsari et al., 2009). Previous network studies that examine substance abuse frequently examine friendship relationships (Ennett et al., 2006; Moody et al., 2011;

Reifman et al., 2006). Conceptually, the network of friendship relationships is perhaps the most straightforward way of understanding social dynamics at the micro level (who is influenced by whom, etc.). In this study, it is treated as a means of understanding popularity or social position (whether someone is well-liked by peers in their organization).

This study was partially motivated by the hypothesis that increasing alcohol use is not rewarded with popularity without condition. Contrary to that hypothesis, the initial correlations between friendship nominations and alcohol use showed a positive, significant correlation between friendship and both drinks per week and alcohol consequences. In the linear regression however, only drinks per week was significant. So when controlling for other variables, alcohol consequences did not predict friendship nominations (the relationship was positive but not significant). Previous researchers have suggested that some of the links between alcohol use and popularity may inadvertently conflate other social factors with alcohol use (Ennett et al., 2006; Moody et al., 2011; Reifman et al., 2006). If college students rarely drink alone, so reporting more drinking occasions may also indicate more time spent socializing with peers. It could be the socializing and not the drinking that is responsible for the association with popularity. One way to interpret the significance of drinks per week but not consequences is that drinking itself appears to be rewarded socially, but the same is not true for harmful or problematic drinking.

This idea is further supported by the regressions testing for nonlinear relationships between alcohol use and friendship nominations mentioned above. These analyses found that, although increasing drinks per week results in increased friendship nominations, the effect is strongest at lower levels of drinks per week. This positive association diminishes, eventually hitting a tipping point and becoming negative. So it was found that increases beyond 36.91 drinks per week actually result in fewer friendship nominations. This value was rather extreme in this sample. There are very few participants who reported more having than 36 drinks per week, so it is very difficult to establish a trend in the data for responses beyond this 36.91 tipping point. Further research with a larger sample is needed to make more conclusive claims.



However, the same phenomenon holds true for alcohol consequences, only at a much less extreme value. The tipping point for alcohol consequences is 8.48, which is quite close to the mean. Unlike the 36.91 figure above, this point is more central so there is enough data to establish a trend for what happens beyond this point. So drinking excessively does incur a social cost, but only at an extreme level. However being a problematic drinker (experiencing alcohol-related consequences at a higher rate) incurs a social cost at much more average levels. This is perhaps unsurprising that drinking problems, which are more visible to peers, could affect status more than solely how many drinks one consumes. It is likely after all that students are probably not actively tracking how much a friend is drinking, but would certainly notice if that friend were to vomit or act belligerently.

Many of the other status indicators in the study were highly correlated with friendship nominations (and with one another). It is not surprising that students who are nominated by others as “admirable” or “fun to be around in a drinking/party setting,” would also be nominated as friends. However, important distinctions between the different types of status were revealed in their correlations with drinking variables.

“Who is fun to be around in a drinking/party setting” was hypothesized to be more strongly related to alcohol variables than the other status measures. This “drinking buddy” variable attempts to capture the type of status that comes with being “the life of the party,” and was therefore hypothesized to be more positively associated with alcohol use than the other status types. Being thought of by your peers as fun to drink with positively correlated to both drinks per week and alcohol consequences. As hypothesized the relationships with drinking variables were stronger with this status type than any other. However even in this case, when controlling for other variables only drinks per week remained a significant predictor. So the findings suggest that this type of status is slightly different from friendship nominations in its relationships to alcohol use, but even here problematic drinking was not shown to be socially beneficial.

Admire nominations and leadership positions gleaned similar ratings in this sample in some important ways. They were highly correlated with one another and age was a strong predictor for both. It stands to reason that senior students would be more likely to be selected for leadership positions and more likely to be admired than freshman or sophomore students. It was initially hypothesized that leadership positions and admire nominations would be more negatively associated with drinking behaviors and harms, on the basis that students would consider things like responsibility and achievement in these kinds of decisions. Specifically I predicted that being the “life of the party” might contribute to certain types of status, including friendship and drinking buddy nominations. I also predicted that it may actually be detrimental to others, such as being elected treasurer of your organization.

Consistent with that hypothesis, these two status types showed less positive associations and more negative associations with drinking variables. Having a higher GPA also predicted more admire nominations. The correlations with drinks per week and alcohol consequences were not significant for either leadership positions or admire nominations. For both, the relationship with alcohol consequences was negative (though not significant), which held true when controlling for other factors in the regressions. Admire nominations were negatively correlated to problem drinker nominations and positively correlated to non-problem nominations.

Overall, each status type demonstrated unique characteristics. Where friendship nominations exhibited a limit of the positive associations with alcohol use, leadership positions and admire nominations demonstrated some negative associations with drinking. Even with drinking buddy nominations, drinks per week had a positive relationship, whereas alcohol related consequences was not a significant predictor when controlling for other factors.

## **Willingness to Intervene**

The findings discussed in the previous sections suggest that students can recognize problem drinkers in their networks with some level of accuracy and that problem drinking can be negatively related to friendships and other types of status within groups. Further study in those areas could lead to a clearer understanding of how to select students who are influential within their social networks. However, if developing interventions that rely on peers to helpfully intervene is the goal, understanding which peers may be more likely to intervene may be just as important as understanding who might have the most impact.

Despite the fact that the literature emphasizes the ways in which peer factors can contribute to harmful drinking, this study found that students can have a positive, protective influence on their peers. Encouraging students to “watch out for each other” is a tactic used by college officials, both formally and informally (for an example, see: (Rawlings, 1997)). Anecdotally, some students pride themselves on this. One would imagine that fraternities and sororities, organizations often founded on the ideals of care and mutual support for ones “brothers” or “sisters,” might be particularly receptive to these types of messages.

To that end, the present study sought to understand to what extent students already exhibit these behaviors, or would express a willingness to do so. Because a preexisting scale assessing willingness to intervene was not found in a search of the literature, one was created for this study. The scale asks students how likely they would be to perform certain actions (on a scale from “extremely likely” to “extremely unlikely”) and whether they have performed the specified action in the past year. The scale lists five specific actions, including: “if I had a friend whose drinking was causing problems for him/her I would talk with my friend about reducing his/her drinking at a time when we were both sober,” “while at a party or drinking occasion, if I saw a person that appeared too drunk, I would try to help that person by suggesting he/she slow down or stop drinking,” and “while at a party or drinking occasion, if I saw a person who was doing something inappropriate, dangerous, or bothersome to others, I would tell someone who could better deal with the situation (friends, authorities, etc.).”

Existing research evidence indicates that there is some social normative pressure against performing these actions. As a student in one focus group study put it, “you don’t want to be known as the ‘grandma’ of your friend group” (Demant & Järvinen, 2011). So it was hypothesized that social status would be related performing these behaviors (or indicating a willingness to perform them). Specifically it was theorized that students who are popular or well liked might feel less pressure to conform to group norms and be more likely to demonstrate willingness to intervene.

This hypothesis was not borne out by the results. Friendship nominations and other status measures were not related to students’ self-reported willingness to intervene. Instead, the analysis suggests that students who utilize protective behavioral strategies while drinking (harm-reducing behaviors like monitoring how many drinks you have consumed) and students who have held a leadership position are more likely to intervene with peers. This was an unexpected but interesting finding and raises questions about why these two variables showed a meaningful association. Though further study is needed to understand what aspects of leadership positions may be pertinent, one aspect that makes leadership positions unique among the status measures in this study is the responsibility it confers on its bearer. Being elected president or recruitment chair of your organization is visible and carries with it a responsibility for certain aspects of the functioning and wellbeing of the organization. It is possible who are already responsible and likely to watch out for others are elected to leadership positions because of those qualities. However, it may be that simply feeling as though you have a larger responsibility as a leader motivates a greater awareness of potential problems or a more proactive stance in helping others.

The second variable that predicted willingness to intervene was use of protective behavioral strategies. The strategies that are part of this scale include: “keep track of how many drinks you were having,” “alternate alcoholic and nonalcoholic drinks,” “avoid drinking shots of liquor,” and “stop drinking at a predetermined time.” These strategies indicate a greater attention to how much one is drinking and an intention to not over-drink. So it is perhaps unsurprising that students who are monitoring their own drinking and taking these small steps to avoid harmful use would also be more

likely to intervene with a friend who is drinking dangerously. However, these strategies are taught and encouraged as a part of many existing harm-reduction programs, so it is encouraging to know that using these strategies oneself might also make one more likely to intervene helpfully with peers. Further research would be needed to determine what factors influence students actually using the strategies.

### **Implications for Intervention**

Though further study is necessary, the current findings do have implications for intervention development. The analyses of drinking and status suggest that drinking problematically is not socially rewarded without condition. One potential implication of this is designing interventions to exploit the message of the empirically established “social cost” for problematic drinking behaviors. This could be done in several ways. First, if new or younger members of fraternities and sororities were made aware of this social cost, they may moderate their own drinking or be more receptive to harm reduction messages. Second, students who disapprove of drinking that negatively impacts the drinker or others may currently keep quiet about these beliefs for fear that others don’t feel the same way. If it was known that harmful use has this negative effect within the entire group, students might be more up front with each other and make their disapproval more explicit. This could represent a profound shift in group norms. Both descriptive norms (how much we believe others are drinking) and injunctive norms (how much we believe others approve of drinking), have been shown to be influential in individual student drinking, so altering beliefs around injunctive norms has promise (Larimer et al., 2004).

The results of this study also suggest that students recognize problem drinkers in their immediate social networks, often at a very high level of agreement. This could have profound effects at organizational, institutional, and individual levels. Reflecting upon this finding, I keep wondering what would happen if the students in one of the participating organizations were shown the distribution of their organization’s problem drinker nominations and were able to see that one or two individuals were

nominated by 60-80% of the group. Would those members be more likely to approach their friends that they thought had a problem and talk with them about getting help? Would they be more likely to talk openly in the future about friends whose behavior was troublesome? These are intriguing possibilities. The ideal outcome is for students in these organizations to create sustainable structures or traditions that promote this kind of awareness and referral. Considered at an institutional level, could an intervention be crafted to encourage this? Could offices of Greek Life incorporate this into the requirements or training that they disseminate to chapters? Health promotion and prevention offices could reach out to other social groups with similar interventions, not just fraternities and sororities.

At the individual level, the fact that student friend-groups could potentially have a shared recognition of the most problematic drinkers is revelatory. An increasing number of college students are recognizing and dealing with serious issues of addiction and dependence and institutions are setting up support communities for this population (Cleveland, Harris, & Wiebe, 2010). Despite these programs, there are still numerous barriers to students seeking recovery from substance abuse (Cleveland et al., 2010). Increasing meaningful referral from peers could help these students who may be grappling with the most acute issues such as addiction or dependence. Most tools that screen students into high-risk categories to receive services rely on self-report. Utilizing peer nomination for screening could provide a beneficial new avenue or recognizing problem drinkers.

In addition to the aforementioned implications for altering norms and increasing referral to help, the findings of this study could also inform programs designed to have students directly intervene to confront or dissuade problematic behaviors while at parties or in other drinking settings. This type of intervention could not only directly prevent some problems, it could also further impact group norms. This kind of peer to peer intervention is visible to others and indicates what behavior is acceptable to the group. Students, especially those in fraternities and sororities, espouse an ethic of taking care of one another. Students in one focus group study gave direct examples of this kind of intervention: "...if I see

that one of my friends who has had a little too much to drink is on his way to the bar after more shots, I might say ‘let’s take a break here,’ or something like that” (Demant & Järvinen, 2011, p. 98).

Existing bystander intervention programs focus on removing barriers to intervention behaviors, including not knowing when to intervene and not knowing what to do to be helpful. Additionally they strive to boost motivation to perform the intervention behaviors (Banyard et al., 2007). The two variables shown in this study to predict willingness to intervene suggest some paths forward. Indeed in a review of research on what influences bystander behavior, Banyard (2011) describes several factors related to individuals’ willingness to intervene as bystanders, including an awareness that the situation is problematic, confidence, and the situation-specific skills to intervene. Problem awareness and situation-specific skills could potentially explain some of the relationship between protective behavioral strategies and willingness to intervene, and the relationship to leadership positions could be partially explained by confidence. Banyard’s review also advocates for further investigation of ecological variables that could affect bystander behavior. The social network factors and group norms discussed here could make an important contribution to that conversation.

As previously mentioned many existing interventions that address college student drinking already educate students about protective behavioral strategies and encourage their use. It may be possible therefore to modify such training or extend it to apply to recognizing potential problems in others and being able to help that person avoid unwanted consequences. These trainings could also be modified to include real world examples or be more tailored specifically to participants’ immediate social groups. As far as motivation to intervene, one peer opinion leader intervention may provide a model. In that program, which showed evidence of efficacy, socially influential leaders in a community were given training on disseminating safe-sex techniques among their friends (Hays et al., 2003). Importantly, a core component of the training with these social leaders was explaining to them why they were selected and fostering a greater understanding of their influence in the community. So perhaps letting students know

that they are influential and conferring some degree of responsibility for others will motivate more positive intervention behaviors.

To follow peer opinion leader methodologies specifically would entail using popularity or status to identify leaders. However one less labor-intensive way to achieve the same effect might be to focus on the older students in a fraternity or sorority and deliver intervention to them. This study has shown age to be related to leadership positions and being looked up to or admired by peers. A training that teaches these students helpful intervention techniques, as well as a greater awareness of both their own influence and the social consequences of problematic drinking, could have a profound effect on bystander intervention and group norms. Also, the recognition of problem drinkers demonstrated in this study makes a poignant argument for tailoring intervention to this small group level, where students have an awareness of who demonstrates problematic behaviors and potentially enough of a relationship to be interested in intervening or referring others.

Previous research has shown particular individual interventions with college students to be effective. However, interventions that focus on an entire student body and aim to change social norms or change a culture have met with mixed results (Dejong, Larimer, Wood, & Hartman, 2009; Wechsler et al., 2003). Focusing intervention on a small social group rather than an individual or entire campus could combine the best of both approaches. Such interventions could target not only fraternities and sororities but athletic teams, residential communities or other social groups.

Though further research is needed, the findings of this study suggest some promising ways forward. Some initial next steps could include design-based research (DBR) to develop and effective intervention based on these findings. DBR methods allow an iterative implementation while collecting student feedback to improve the program and refine the underlying theory (Brown, 1992). Student feedback would be essential to the process of translating the data collected here into effective interventions.



## **Limitations and Opportunities for Future Study**

This study was exploratory and relatively small in scope. The small sample size is limiting in a few ways. First a larger sample, especially one drawn from multiple institutions or varied Greek systems (multicultural organizations, national as well as local chapters, etc.), would yield more generalizability. Athletic teams also represent an important subgroup that, like Greek organizations, is at higher risk for alcohol-related harms (Ham & Hope, 2003) and could also be ripe for bystander intervention programs. So continuing this work with athletic teams as well as fraternities and sororities could be beneficial.

Additionally, the analyses conducted in this study represent a small fraction of what is possible given the nature of the data collected. Transforming the nomination variables into a proportion allowed for direct comparisons across multiple networks of varying sizes. However this approach boils down very rich and informative patterns of relationships to a few numbers. There are certainly meaningful analyses that would be possible with more participants and a greater number of organizations in the study. Some suggestions for future study would include examining other measures of centrality (e.g. eigenvalues, betweenness), subgroups or network neighborhoods, and examining how network properties like density affect the relationships among status and drinking variables.

Many of the variables used are unique to this study. Friendship status is conventional in social network analysis, but admire, drinking buddy, and problem/non-problem drinker nominations are all specific to this study. This raises important questions about these conceptions of status. Though a small pilot study was conducted with the instrument used in this study, it is worth examining whether the wording was clear for participants and captured the intended construct and to what extent the selected constructs are meaningful to students. It is also important to investigate whether there are other markers of status not explored in the present study that are important to students or influential with regard to drinking behaviors. Further qualitative research could help establish how students conceptualize who among their peers is influential and what types of status are desirable. It could also illuminate what behaviors or qualities students think of when making problem drinker determinations.

The “willingness to intervene” scale was also constructed for this study (based on bystander intervention research not specifically geared to reducing drinking harms). The scale may leave out important intervention behaviors and it may not effectively capture differences in which students might intervene helpfully with others, so further examination of intervening behaviors is needed. A follow-up mixed-methods study that investigates what bystander intervention behaviors students already perform or endorse could help answer some of the questions not directly addressed by this study. Such a study could help identify opportunities for helpful intervention, potential barriers, and the kind of messaging that might be well received by students.

Even though the present study is exploratory and relatively small in scope, it addresses some gaps in the existing literature. The findings of this study suggest that (1) students can recognize problem drinking in their peers and these perceptions may identify harms not fully captured by existing measures, (2) that drinking, especially problematic drinking, is not socially rewarded unconditionally and can be negatively related to friendship and status, and (3) that students who hold leadership positions in their organizations and students who use protective behavioral strategies while drinking are more likely to helpfully intervene with friends. These findings make an argument for the potential of interventions that aim to engage students as part of the solution.

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**Appendix**  
**Survey Instrument**



Please rank your agreement with the following statements using the following scale:

(1) Strongly disagree      (2) Disagree      (3) Neutral      (4) Agree      (5)

**Strongly agree**

1. "I attend all or almost all meetings and social functions of my fraternity." \_\_\_\_\_
2. "All or almost all of my close friends at school are members of this fraternity." \_\_\_\_\_
3. "Volunteer work is a priority in this fraternity." \_\_\_\_\_
4. "It is important to me that other members of this fraternity approve of my actions or decisions." \_\_\_\_\_

5. The next several questions ask about your **willingness to intervene** in certain situations. Please rank how likely you would be to perform the action described using the following scale:

(1) Extremely unlikely      (2) Unlikely      (3) Neutral      (4) Likely      (5)  
Extremely Likely

If I had a friend whose drinking was causing problems for him/her I would talk with my friend about reducing his/her drinking at a time when we were both sober.	1	2	3	4	5
• Have you done this in that past year?	Yes	No			
While at a party or drinking occasion, if I saw a person that appeared too drunk, I would try to help that person by suggesting he/she slow down or stop drinking.	1	2	3	4	5
• Have you done this in the past year?	Yes	No			
While at a party or drinking occasion, if I saw a person that appeared too drunk, I would try to help that person by telling someone who could better deal with the situation (friends, authorities, etc.).	1	2	3	4	5
• Have you done this in the past year?	Yes	No			
While at a party or drinking occasion, if I saw a person who was doing something inappropriate, dangerous, or bothersome to others, I would confront that person myself to get them to stop.	1	2	3	4	5
• Have you done this in that past year?	Yes	No			
While at a party or drinking occasion, if I saw a person who was doing something inappropriate, dangerous, or bothersome to others, I would tell someone who could better deal with the situation (friends, authorities, etc.).	1	2	3	4	5
• Have you done this in the past year?	Yes	No			



8. For the **past month**, please fill in a number for each day of the week indicating the **typical number of drinks** you usually consume on that day and the **typically number of hours** you usually drink on that day.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of drinks consumed							
Hours spent drinking							

9. Think of your **heaviest drinking day** over the **past month**. Record the number of drinks you consumed and the hours you spent drinking on that day. Number of drinks: \_\_\_\_ Hours spent drinking: \_\_\_\_\_. (Mark 0 for both if you do not drink.)

10. Below is a list of things that sometimes happen to people either during or after they have been drinking alcohol. Next to each item below, please circle either YES or NO to indicate whether that item describes something that has happened to you **in the past month**. (Mark "No" for all items if you do not drink.)

While drinking, I have said or done embarrassing things.	Yes	No
I have had a hangover (headache, sick stomach) the morning after I had been drinking.	Yes	No
I have felt very sick to my stomach or thrown up after drinking.	Yes	No
I often have ended up drinking on nights when I had planned not to drink.	Yes	No
I have taken foolish risks when I have been drinking.	Yes	No
I have passed out from drinking.	Yes	No
I have found that I needed larger amounts of alcohol to feel any effect, or that I could no longer get high or drunk on the amount that used to get me high or drunk.	Yes	No
When drinking, I have done impulsive things I regretted later.	Yes	No
I've not been able to remember large stretches of time while drinking heavily.	Yes	No
I have driven a car when I knew I had too much to drink to drive safely.	Yes	No
I have not gone to work or missed classes at school because of drinking, a hangover, or illness caused by drinking.	Yes	No
My drinking has gotten me into sexual situations I later regretted.	Yes	No
I have often found it difficult to limit how much I drink.	Yes	No
I have become very rude, obnoxious, or insulting after drinking.	Yes	No
I have woken up in an unexpected place after heavy drinking.	Yes	No
I have felt badly about myself because of my drinking.	Yes	No

I have had less energy or felt tired because of my drinking.	Yes	No
The quality of my work or school work has suffered because of my drinking.	Yes	No
I have spent too much time drinking.	Yes	No
I have neglected my obligations to family, work, or school because of	Yes	No
My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives.	Yes	No
I have been overweight because of drinking.	Yes	No
My physical appearance has been harmed by my drinking.	Yes	No
I have felt like I needed a drink after I'd gotten up (that is, before breakfast).	Yes	No

11. Please indicate how often you have used the following strategies in the **past month**. Mark "N/A" if you do not drink.

(1) Never    (2) Rarely    (3) Sometimes    (4) Often    (5) Always    (N/A) Not Applicable

**Strategy**

Determine not to exceed a set number of drinks	1	2	3	4	5	N/A
Alternate alcoholic and nonalcoholic drinks	1	2	3	4	5	N/A
Have a friend let you know when you've had enough	1	2	3	4	5	N/A
Leave the bar/party at a predetermined time	1	2	3	4	5	N/A
Stop drinking at a predetermined time	1	2	3	4	5	N/A
Drink water while drinking alcohol	1	2	3	4	5	N/A
Avoid drinking games	1	2	3	4	5	N/A
Avoid drinking shots of liquor	1	2	3	4	5	N/A
Avoid mixing different types of alcohol	1	2	3	4	5	N/A
Drink slowly, rather than gulp or chug	1	2	3	4	5	N/A
Avoid trying to "keep up" or out-drink others	1	2	3	4	5	N/A
Eat before and/or during drinking	1	2	3	4	5	N/A
Keep track of how many drinks you were having	1	2	3	4	5	N/A
Avoid hard liquor or spirits	1	2	3	4	5	N/A
Carry around a cup with no alcohol or deliberately "nurse" a drink	1	2	3	4	5	N/A
Avoid situations where there was alcohol	1	2	3	4	5	N/A
Limit drinking to certain days of the week	1	2	3	4	5	N/A
Find other ways besides drinking to reduce stress	1	2	3	4	5	N/A

<b>Choose to participate in enjoyable activities that do not include alcohol consumption</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
<b>Practice ways to be more comfortable in social settings without using alcohol</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
<b>Drink beer with a lower alcohol content (light beer) instead of stronger alcoholic beverages</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
<b>Engage in activities while drinking to space out drinks (i.e. dancing, playing pool, darts)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
<b>Be aware of internal body sensations that indicate you are getting intoxicated</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>

**12.** To show that you are paying attention to the questions in this survey and reading carefully, please select “I am not paying attention.”

**I am strongly paying attention                      I am slightly paying attention**  
**I am not paying attention**

**The questions on the next several pages ask you to nominate other members of your fraternity in response to certain questions. To protect anonymity, you have been given a separate sheet of paper with the names that correspond to each person’s 4 digit identification code (the Name Overlay). Line up the Name Overlay so that the corner arrows and all lines match. If you have any questions ask the test administrator.**

13. Using the name overlay, please mark an “X” next to your own name in the column labeled “Mark Here.”




*(Line up with corresponding arrows on Name Overlay)*

	Mark Here		Mark Here
2401		2420	
2402		2421	
2403		2422	
2404		2423	
2405		2424	
2406		2425	
2407		2426	
2408		2427	
2409		2428	
2410		2429	
2411		2430	
2412		2431	
2413		2432	
2414		2433	
2415		2434	
2416			
2417			
2418			
2419			




**14. Who are your close friends in the fraternity that you spend the most time socializing with? (Place an “X” next to the name in the column labeled “Mark Here”)**

*(Line up with corresponding arrows on Name Overlay)*



	Mark Here		Mark Here
2401		2420	
2402		2421	
2403		2422	
2404		2423	
2405		2424	
2406		2425	
2407		2426	
2408		2427	
2409		2428	
2410		2429	
2411		2430	
2412		2431	
2413		2432	
2414		2433	
2415		2434	
2416			
2417			
2418			
2419			



**15. Who are the people that are most fun to be around in a drinking/party setting?  
(Place an “X” next to the name in the column labeled “Mark Here”)**



*(Line up with corresponding arrows on Name Overlay)*

	Mark Here		Mark Here
2401		2420	
2402		2421	
2403		2422	
2404		2423	
2405		2424	
2406		2425	
2407		2426	
2408		2427	
2409		2428	
2410		2429	
2411		2430	
2412		2431	
2413		2432	
2414		2433	
2415		2434	
2416			
2417			
2418			
2419			





16. Who do you admire or look up to? (Place an “X” next to the name in the column labeled “Mark Here”)



*(Line up with corresponding arrows on Name Overlay)*

	Mark Here		Mark Here
2401		2420	
2402		2421	
2403		2422	
2404		2423	
2405		2424	
2406		2425	
2407		2426	
2408		2427	
2409		2428	
2410		2429	
2411		2430	
2412		2431	
2413		2432	
2414		2433	
2415		2434	
2416			
2417			
2418			
2419			



**17. Who is able to drink/party without getting out of control or causing problems for himself? It is ok to nominate yourself. (Place an “X” next to the name in the column labeled “Mark Here”)**



*(Line up with corresponding arrows on Name Overlay)*

	Mark Here		Mark Here
2401		2420	
2402		2421	
2403		2422	
2404		2423	
2405		2424	
2406		2425	
2407		2426	
2408		2427	
2409		2428	
2410		2429	
2411		2430	
2412		2431	
2413		2432	
2414		2433	
2415		2434	
2416			
2417			
2418			
2419			



- 18. Who loses control, or causes problems for himself or others while drinking?**  
**It is ok to nominate yourself. (Place an “X” next to the name in the column labeled “Mark Here”)**



*(Line up with corresponding arrows on Name Overlay)*

	Mark Here		Mark Here
2401		2420	
2402		2421	
2403		2422	
2404		2423	
2405		2424	
2406		2425	
2407		2426	
2408		2427	
2409		2428	
2410		2429	
2411		2430	
2412		2431	
2413		2432	
2414		2433	
2415		2434	
2416			
2417			
2418			
2419			



*For the next set of questions, try to think as accurately as you can when and how much a typical person in the specified category **of your same gender** would drink during a typical week.*

*First think of a typical week for such a person. For each day of the week in the calendar below, fill in the number of standard drinks typically consumed on that day in the box.*

**Please fill in whole numbers. Do not indicate a range.**

**19.** In the calendar below, please fill in the average amount of alcohol you believe was consumed during a typical week during the **past month** for **your close friends**.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of drinks consumed							

**20.** In the calendar below, please fill in the average amount of alcohol you believe was consumed during a typical week during the **past month** for **an average member of your fraternity**.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of drinks consumed							

**21.** In the calendar below, please fill in the average amount of alcohol you believe was consumed during a typical week during the **past month** for **an average student at your college/university**.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of drinks consumed							

The next set of items asks you to report **how much you believe others would approve of certain drinking behaviors.**

**22.** Please rank the response to each behavior for each group listed, using the following scale:

(1) Strong disapproval      (2) Moderate disapproval      (3) Mild disapproval  
 (4) Wouldn't care    (5) Mild Approval    (6) Moderate Approval  
 (7) Strong Approval

How much would the following people approve of...	Your close friends	Average member of your fraternity	Average student at your college/ university
...drinking alcohol every weekend.			
...drinking alcohol daily.			
...drinking enough alcohol to pass out.			
...driving a car after drinking.			
...deciding not to drink at a party.			
...missing a class because you were intoxicated or hungover.			
...deciding to miss a party for an alcohol-free social event.			
...drinking so much that you lose control.			
...drinking so much that you cause problems for others.			
...drinking so much that you do something you regret later.			

**23.** What is your **age** as of today: \_\_\_\_\_

**24.** Which best describes your current **year in school** (circle one):      freshman (1<sup>st</sup> year)  
    sophomore (2<sup>nd</sup> year)      junior (3<sup>rd</sup> year)      senior (4<sup>th</sup> year)  
    5<sup>th</sup> year or beyond

**25.** Approximate **weight** (for purposes of calculating BAC): \_\_\_\_\_ lbs.

**26.** Which of the following best describes your grade point average **this year**? Estimate to the best of your ability:    A    A-    B+    B    B-    C+    C    C-  
    D

**THIS IS THE END OF THE SURVEY. PLEASE RETURN THIS PACKET TO THE ADMINISTRATOR ALONG WITH YOUR NAME OVERLAY. THANK YOU FOR YOUR TIME AND PARTICIPATION!**

## VITA

### Jared W. Rodrigues

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#### Education

Ph.D. in Higher Education, Department of Education Policy Studies, Penn State University.  
M.Ed. in Counseling Psychology, College of Education, Temple University.  
B.A. in English, University of the South.

#### Honors and Awards

Ostar Fellowship, 2012  
Higher Education in Review Symposium Award, 2011  
Malnati Award, 2007

#### Professional Experience

Penn State University, University Park- Student Affairs/Higher Education Dept., August 2010-August 2013. Graduate/Research Assistantship. *Alcohol Symposium Planning Committee Chair, Collegiate Recovery Community Coordinator, Student Alcohol Advisory Committee Coordinator, Other Duties.*  
Rankin & Associates Consulting, Howard, PA March 2012-Present, *Research Associate.*  
Ursinus College- Residence Life Office, Collegeville, PA July 2007- August 2010, August 2013-Present. *Assistant Director Residence Life, Wellness Education Coordinator* (August 2008-August 2010).  
Temple University- Tuttleman Counseling Services, Philadelphia, PA August 2005- May 2007, *Peer Education Coordinator for "Campus Alcohol and Substance Awareness (CASA)."*

#### Teaching Experience

Co-Instructor, Penn State University, University Park- College Student Affairs 501 (2011).  
Course Instructor, Ursinus College, CIE100 (2009).  
Lead Faculty, Study Abroad Immersion Program (2010)

#### Publications/Presentations

"Alcohol in College: Students as the Solution" Rodrigues, Jared. Presented at Penn State University Park Undergraduate Association (UPUA) Encampment, January, 2013.  
"Student Departure as a Learned Phenomenon" Kimball, Ezekiel and Rodrigues, Jared. Presented at American College Personnel Association National Conference in March 2011, and the Higher Education in Review Symposium in April 2011.  
"The American 'Student Affairs' Perspective on College Student Success" Rodrigues, Jared. Presented to students and faculty at Tohoku Gakuin University in Sendai, Japan.