IDENTIFICATION OF COLLEGE STUDENTS’ RECREATIONAL NETWORKS
AND THE TEMPORAL ASSOCIATION WITH DRINKING AND HOOKING-UP

A Dissertation in
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by

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ABSTRACT

For young adults, alcohol use and sexual behavior are imbedded in a particular form of social network: the people whom they engage in a variety of activities with over a weekend, referred to as a recreational network. Little attention has been paid to examining these recreational networks in previous research. The current study attempts to fill this gap.

The first aim of the present study was to examine the heterogeneity in network characteristics associated with drinking and hooking-up sexual behavior among undergraduate college students. The second aim was to explore the temporal changes that occur over a weekend within these recreational networks and their association with drinking and hooking-up. From a behavior change perspective, the Theory of Planned Behavior (TPB) suggests that people’s social relationships can shape their behavior through norms. Therefore, this theory along with a social network perspective were combined to explain why students may be drinking and hooking-up in distinct recreational networks over the weekend.

In the spring, summer, and fall semesters of 2012, 435 college students completed the HUDSoN (Hooking Up and Drinking Social Network) Questionnaire on consecutive days during a weekend. The HUDSoN includes: 1) questions on hooking-up and drinking behavior and 2) a social network inventory that examines with whom students are hanging out, characteristics of those individuals, and the multi-dimensional relationships among network members. To achieve the first aim, latent class analysis (LCA) was used to identify recreational network profiles using data from Friday night.
Six network indicators were used in the LCA model: 1) size, 2) gender diversity, 3) drinking buddies in the network, 4) activities engaged in by each network member, 5) level of trust within the network, and 6) age of network members. Hooking-up and drinking behavior were then added to the LCA model as covariates. To achieve the second aim, latent transition analysis (LTA) was used to explore the temporal changes that occur within college students’ recreational networks from Thursday to Friday night using the same six network indicators. Hooking-up and drinking behavior were then added to the LTA model as covariates to examine whether these behaviors are associated with movement between the network classes.

As a result of the LCA three distinct network classes were identified: 1) Risky Partiers (26.7%), 2) Restrictive Partiers (34.0%), and 3) Restrictive Non-Partiers (39.3%). Alcohol consumption and hooking-up were associated with membership into network class. Students who consumed alcohol were most likely to be Risky Partiers and less likely to be Restrictive Partiers in comparison to Restrictive Non-Partiers. Students who hooked-up were most likely to be Risky Partiers or Restrictive Partiers compared to Restrictive Non-Partiers. As a result of the LTA model four distinct network profiles were identified: 1) Risky Partiers (22.9%, 25.8%), 2) Restrictive Partiers (28.3%, 44.8%), 3) Inclusive Non-Partiers (28.8%, 3.0%), and 4) Restrictive Non-Partiers (19.9%, 26.3%). Alcohol consumption and hooking-up were associated with movement between the recreational network classes from Thursday to Friday night. Drinking was associated with an increased likelihood of students transitioning to Risky Partiers from Thursday to
Friday night, whereas hooking-up behavior was only associated with Inclusive Non-Partiers transitioning to Risky Partiers.

Findings from this study suggest that students drink and engage in sexual behavior in different ways depending on their recreational networks. These findings have potential implications for interventions to decrease risky alcohol and sexual behaviors targeting the type of recreational networks in which undergraduate students choose to embed themselves.
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Chapter 1

Introduction

This chapter introduces the significance and purpose of the present study regarding the impact of peer groups (in the form of social networks) on drinking and sexual behavior in college. Next, the research problem is stated along with the purpose of the study. Then, specific aims and research questions are addressed. Finally, a list of definitions and important terms are provided.

Background and Significance

The college experience is not just about studying and getting a degree as a means to a well-paying job after graduation. College includes social experiences like creating friendships that will last a lifetime. For many, college life also includes “hooking-up,” (Gute, 2008) going to parties, and drinking alcohol (Borsari & Carey, 2001). For example, one of the first things that students do when they come to college is create friendships. This often entails a certain level of socialization that involves going to dorm events, apartment or fraternity parties, and organized school clubs. Since the college years are typically marked by social activity, alcohol consumption is often used to expedite the friendship making process (Burger & Koch, 2011). In this environment students are at risk for heavy episodic or binge drinking (i.e., consuming more than five drinks in one occasion; Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002).
This type of drinking behavior is often associated with adverse consequences including engaging in high-risk sexual behavior like hooking-up (Perkins, 2002). While some students hook-up with random people in the form of a one-night stand, the majority of hook-ups often involve someone that the student is familiar with, e.g., a person in his or her social network (Heldman & Wade, 2010). This suggests that students choose to hook-up with partners with whom they feel some sense of security and familiarity while drinking (Stinson, 2010), but this may also put them at risk for an unwanted sexual experience (Koch & Colaco, 2009).

Compared to males, females are at an increased risk of having an unwanted sexual experience which includes nonconsensual and unwanted touching, kissing, fondling, attempted rape, and rape. Flack and colleagues (2007) found that one third of female college students experienced some form of unwanted sex usually under the influence of alcohol. Of this group, 78% of the unwanted sexual encounters took place during a hook-up. Before graduating, an estimated 20% of female college students will experience rape or attempted rape usually perpetrated by someone in her social network like a friend or acquaintance (Fisher, Daigle, Cullen, & Turner, 2003).

Past research has identified some of the social aspects associated with drinking and high risk sexual behavior in college. Students are more likely to drink with friends or other people they know, and are more likely to hook-up with a friend or acquaintance while drinking (Heldman & Wade, 2010). Therefore, students are engaging in these behaviors within a social network. Yet, past research has failed to identify the characteristics and the heterogeneity of social networks associated with these behaviors.
and how these networks change over time in regard to engaging in alcohol consumption and sexual activity.

**Statement of the Problem**

Researchers have identified complex relationships between alcohol use, hooking-up, and unwanted sex among college students. An aspect of this relationship is that alcohol use is a risk factor for both hooking-up and unwanted sexual experiences (Abbey, Ross, McDuffie, & McAuslan, 1996; Fielder & Carey, 2010; Testa, Hoffman, & Livingston, 2010). Students typically consume alcohol preceding a hook-up in order to make hooking-up “easier” (Green, 2005), with 64% of students having at least one drink prior to hooking-up (Fielder & Carey, 2010). In regard to the relationship between drinking and unwanted sexual experiences, 50% of sexual assaults involve the use of alcohol by the perpetrator, victim or both (Abbey, 2002).

According to the Theory of Planned Behavior, there are multiple mechanisms through which risky drinking and sexual behavior can occur (Ajzen, 1991, 2002). One of these mechanisms is through the influence of social norms (Ajzen, 1991, 2002). Broadly, social norms influence intentions and those intentions influence whether an individual is likely to engage in drinking and/or high risk sexual behavior. Since social norms are associated with drinking, it can be postulated that social network structure may also be associated with patterns of drinking and sexual behavior. Therefore, when a student has intentions to engage in a particular behavior, like drinking, he or she may choose to interact socially with individuals who can facilitate his or her drinking intentions.
Furthermore, when an individual interacts with a chosen social network, this network may then influence or reinforce his or her social norms.

While social networks are a key component, the role of students’ social networks concerning alcohol use, sexual behavior (“hooking-up”), and unwanted sexual experience is still unclear. Thus, it is important to utilize a repeated measures methodological design and analytic approach to gain a better understanding of social network structures and their role in drinking and high risk sexual behavior. Once the network structure of alcohol use and hooking-up is identified, researchers can create interventions that target the network in an attempt to change network structures that facilitate potentially harmful behaviors and enhance structures that are protective against these behaviors.

**Statement of Purpose**

The purpose of this study was to use repeated measures data from The Recreational Activities of College Students Study in order to identify the temporal complexities of network characteristics as they relate to drinking alcohol and engaging in sexual behaviors (e.g. hooking-up) among a sample of college students over the period of a weekend.
Research Questions

This research was guided by the following aims and research questions.

**Aim 1. Examine the heterogeneity in network characteristics associated with drinking and hooking-up.**

RQ 1: What network profiles (latent class structures) represent the variation in recreational networks among college students on a weekend night?

RQ 2: Are college students’ drinking and hooking-up behaviors associated with particular recreational networks?

**Aim 2. Explore the temporal changes in network characteristics associated with drinking and/or high risk sexual behavior that occur over a weekend.**

RQ 3: How do students’ recreational networks change from Thursday to Friday night?

RQ 4: How are college students’ drinking and hooking-up behaviors associated with changes in the students’ recreational networks?

Definition of Terms

The following definitions are provided to ensure uniformity and understanding of these terms throughout the study. The researcher developed all definitions not accompanied by a citation.

*Alcohol use.* Drinking any amount of alcohol excluding tastes or sips (Grant & Dawson, 1997).
**Heavy episodic drinking.** Consuming five or more drinks for men and four or more drinks for women in one setting or occasion (Wechsler et al., 2002).

**Binge drinking.** See heavy episodic drinking (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994).

**Hook-up.** Refers to engaging in a variety of sexual activities including: making out, oral sex, and/or penetrative sex with no emotional commitment to the other person(s) involved (Garcia & Reiber, 2008; Glenn & Marquardt, 2001).

**Social network.** The web of social relationships that surround an individual (Wasserman & Faust, 1994).

**Recreational network.** A subset of an individual’s social network which includes peers that students choose to engage with during weekend activities.

**Unwanted sexual experiences.** Any of a variety of behaviors that can be consensual or nonconsensual, which may include experiences referred to as regretted sex, aggressive sex, incapacitated sex, sexual assault and rape (Banyard, Ward, Cohn, Plante, Moorhead, & Walsh, 2007; Koch & Colaco, 2009).

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**Organization of the Dissertation**

As presented earlier, the purpose of the present study is to identify and capture the temporal complexities of network characteristics as they relate to drinking alcohol and engaging in sexual behaviors among a sample of college students over the period of a weekend. Chapter 1 of this dissertation includes a short overview of important areas related to this research, a statement of the problem, the study’s purpose, specific research
questions, and a list of definitions of important terms. Chapter 2 provides a review of the literature. Chapter 3 contains the methodological information. Chapter 4 presents the findings of the research. Finally, a discussion of these findings, conclusions drawn from these findings, and recommendations for further study are addressed in Chapter 5.
Chapter 2

Overview of the Literature

The purpose of this study was to identify and capture the temporal complexities of network characteristics as they relate to drinking alcohol and engaging in sexual behaviors (e.g. hooking-up) among a sample of college students over the period of a weekend. The studies reviewed in this chapter are divided into four broad categories: 1) Social Networks, 2) Alcohol Use in College, 3) Hooking-up in College, and 4) Unwanted Sexual Experiences. These four phenomena are extremely interrelated within the college environment. Therefore, they have been organized accordingly to highlight both the individual significance and interrelatedness of each phenomenon.

Social Networks

Broadly, social networks are the web of social relationships that surround an individual (see Figure 2-1). These social relationships can typically be expressed as patterns or regularities in relationships among interacting individuals. These patterns are typically referred to as the structure of the network (Wasserman & Faust, 1994). For example, in line with the topic under review, all fraternity members in a house could be sampled. They could be asked who their friends are, who they are closest to, who they think is cool, and who they want to be their friends within the fraternity house. Next, the fraternity members could be asked a series of demographic questions in conjunction with drinking and sexual behavior indicators, such as how much they drink, how often, with
whom they drink, and how many people they have hooked-up with. A network approach in this hypothetical study would look at the interactions among the fraternity members in order to better understand how they influence each other’s drinking and sexual behavior. Patterns could be seen within the network. For example, if binge drinkers are friends with other binge drinkers or if fraternity members are emulating behavior exhibited by members they think are “cool.”

Figure 2-1. Visual Example of a Social Network.

The structure of the social network can be also described in terms of the network as a whole (socio-centric) or in terms of relationships between certain individuals (ego-centric) within the network. Density is one such metric that can be viewed in either of these two ways. Socio-centric density is the ratio of how many relational ties are between actors in total to the potential number of relational ties (Hanneman & Riddle, 2005),
whereas egocentric density is calculated similarly, but in regard to a set of ties that surrounds a particular network member (ego) (Burt, 1987). To further elucidate the concept of socio-centric and ego-centric density, the previous hypothetical fraternity network is used. The fraternity house as a whole could be a dense network, meaning there are many relational ties between each of the fraternity members. Simply put, most of the potential ties are actually present. All fraternity members could be friends with each other. On the other hand, the fraternity network could have a lower density, meaning that few of the potential ties are actually present. This could mean that fraternity members in the house are only friends with a few other members, suggesting members either do not know each other well or do not like each other. In this case, the researcher may want to use an ego-centric measure of density to evaluate those few fraternity members that have ties.

The social network perspective encompasses theories, models, and applications that are expressed in terms of relationship concepts or processes. In addition to the relational aspect of social networks, there are a few other noteworthy concepts that tend to separate a network perspective from other perspectives. First, actors (individuals within the network-fraternity members) and their actions are viewed as interdependent rather than independent. Second, linkages between actors (i.e., relational ties such as friendships or drinking buddies) are channels for transfer or flow of resources and information from one actor to another. Third, network models can focus on whether individuals view a network’s structural environment as providing opportunities for or constraints on individual action (drinking behavior of one fraternity member influencing
another’s behavior). Finally, these models conceptualize structure (i.e., social, economic, and political) as lasting patterns or relations among actors (Wasserman & Faust, 1994).

Social Networks and Transitioning to College

Incoming and matriculated college students are presented with a range of academic, social, and developmental challenges that must be traversed with a sudden increase of autonomy. Some of these challenges include separation and individualization from family, acquisition of independent living skills, changes in identity, demands of an academic lifestyle, and the formation and maintenance of social networks (Schulenberg, Maggs, & Hurrelmann, 1997). If a student is unable to cope with these challenges in a positive way, this may result in poor academic performance and negative health behaviors (Pittman & Richmond, 2007). Making a successful transition is vital because many adaptive and coping patterns formed during this period may carry long-term implications post-college (Shaver, Furman, & Buhrmester, 1985). For instance, drinking patterns can persist throughout college and into young adult life. Jackson and colleagues (2001) found that while some students matured out of heavy drinking, men and those with a family history of alcohol use were more likely to stay binge drinkers throughout all four years of college and even three years post-college.

Generally, peers are central to the lives of emerging adults. Erikson’s theory of psychosocial development suggests that the major developmental task of the early twenties is to establish close relationships (Erikson, 1963). Peer influence increases throughout adolescence and into college (Smetana, Campione-Barr, & Metzger, 2006).
The developmental trajectory of any particular relationship influences and, in return, is influenced by the social context in which that particular relationship is embedded. Once students transition into college and move away from their families, they tend to start seeking support from friends to help them through their big life changes (Fraley & Davis, 1997; Friedlander, Reid, Shupak, & Cribbie, 2007). Research has shown that friends provide social support for well-being, health, and developmental challenges during the transition to college and throughout the college years (Adams & Blieszner, 1995; Friedlander, et al., 2007; Schulenberg et al., 1997).

Positive support from a peer group, like having someone to go to social activities with, is associated with more positive developmental outcomes (Brown & Klute, 2003) such as higher self-esteem (Laible, Carlo, & Roesch, 2004) and enhanced social skills (Collins & Steinberg, 2006). Further, researchers have found that the degree to which a student feels connected to peers is linked to better social adjustment (Dugan, 2013; Tao, Dong, Pratt, Hunsberger, & Pancer, 2000), lower levels of depressive symptoms, higher academic motivation, and lower attrition rates (Beyers & Goossens, 2002). In contrast, students who did not have a sense of connectedness to their network were more likely to experience increased stress and emotional distress (Pittman & Richmond, 2007). According to Social Impact Theory (Latane, 1981), how connected an individual feels to a group influences that individual’s behaviors and attitudes. Therefore, students may be choosing to engage in a variety of new behaviors in order to remain connected to the group (Borsari & Carey, 2001). If a student feels a high sense of connectedness with his or her peer group, that individual may be influenced by his or her perceptions of the group’s normative behavior (Hummer, LaBrie, & Pedersen, 2012). More specifically,
Maxwell (2002) found that the closeness of students to same-sex peers predicts the initiation of drug and alcohol use, while a review by Borsari and Carey (2001) showed that peer groups are directly related to personal attitudes and behaviors towards drinking. Thus, students are shaped by the social networks in which they choose to embed themselves.

Other researchers have also suggested that the degree to which a student feels connected is linked to better social adjustment (Tao et al, 2000), lower levels of depressive symptoms, higher academic motivation, and lower attrition rates (Beyers & Goossens, 2002). In a study conducted by Pittman and Richmond (2007), 79 freshman students completed questionnaires on the quality of their friendships and psychological adjustment twice over the year. Findings revealed more positive changes in friendship quality were linked to decreasing reports of psychological distress over time. In addition, students who did not have a sense of connectedness to their peer group were more likely to experience increased stress and emotional distress (Pittman & Richmond, 2007). However, students who had a peer network that provided social support and who had the opportunity to engage in social activities together were less likely to experience psychological distress.

As students transition into college, their parents may play less of a direct role on their behavior, leaving a space to be filled by peers (Smetana et al., 2006). In a study evaluating the effects of a parent-based intervention to minimize college student drinking, Turrisi and colleagues (2013) found temporal effects regarding the administration of the intervention. In this randomized controlled intervention trial, parents were asked either to speak to their child about drinking pre-matriculation, pre-matriculation with a booster
post-matriculation, or only post-matriculation. Findings revealed that parents who spoke to their adolescent about drinking before they arrived to college were the most effective at decreasing heavy student drinking compared to the control and post-matriculation group. Meanwhile, receiving the intervention post-matriculation was not effective at preventing students who initially identified as non-drinkers from escalating their drinking. Taken together, these findings suggest that after students enter college, they may become more influenced behaviorally by their social peer networks rather than by their home networks or parents.

**Development of Social Networks in College**

The term social network is broad and is defined as a set of actors (i.e., individuals) and a set of relations or ties that connect them (Wasserman & Faust, 1994). Smith and Christakis (2008) show that many researchers have examined the particular characteristics of those who make up a person’s social network (e.g. friends, family, and acquaintances) and the types of relations that connect them (e.g. trust, similarity, and likability). During the first two years of college, students are most likely to create friendship ties and start to solidify their own social networks (Klausner, 2009). Friendship ties may be made with classmates, roommates, other students in the same dorm, or students from various social organizations like Greek Life, athletics, and student clubs (Dugan, 2013). Furthermore, social networks are likely to change over time, with some relationships dissolving and others becoming more solidified throughout the college years.
The friendship-making process follows a series of interactions where students may start to form friendship ties through superficial areas of exchange and then later shift towards more intimate areas. This typically happens through reciprocal self-disclosure (Altman & Taylor, 1973). According to this view, self-disclosure operates according to a “norm of reciprocity,” a quid pro quo agreement between people (Gouldner, 1960). In other words, intimate self-disclosure by one person creates openness from another and thus fosters a similar reciprocal reaction. Students may first begin talking about classes, then move into the domain of talking about their families, and continue down a path of sharing more and more intimate information about themselves. Therefore, the influence that a student’s network may have on his or her behavior may depend on the developmental stage of that network, including the role of each network member and how long they have known each other.

Students’ social networks have a tendency to change throughout the college years, and individual differences such as age, sex, social class, and geographic location affect both their structure and function. To provide an example, females tend to have larger social support networks and receive more emotional support from their network members relative to males (Burda, Vaux, & Schill, 1984). Typically, during the freshman year, students start out as acquaintances and then quickly increase the level of intimacy in their relationships (Hays & Oxley, 1986). Hays & Oxley sampled 89 students three times over a 12-week period (at the fourth, eighth, and twelfth week of the fall semester) and found that students living in the dormitory and students that commuted to campus did not differ in size of social network. All students had, on average, 8 network members, but network compositions differed by group. Freshman students who lived on campus tended to have
a higher percentage of new acquaintances than those students who lived at home and commuted. Students living on campus also had more students in their networks whereas students who lived off campus tended to have more non-students and relatives in their networks. The researchers also found gender differences in network composition. Male students were more likely to nominate more females as network members than female students were to nominate males as network members. As students’ networks change throughout college, it is important to have an understanding of the types of networks in which they are embedded, as with whom students interact impacts their social adjustment, development (Friedlander et al., 2007), attitudes, and behavior (Hummer et al., 2012; Newcomb, 1962).

The Recreational Network

College students are involved in a variety of recreational activities. Many of these recreational activities involve interacting with peers. For instance, Stebbins (2001) conceptualized that college students engage in serious leisure activities (amateur sports and volunteering) and casual leisure activities (socializing, watching television, and “hanging out” with friends). Serious leisure activities are sustained activities with a focused goal, often requiring a commitment to learning new skills, whereas casual leisure activities require little skill or commitment and are considered pleasurable.

Among college students, studies show that engaging in more casual leisure activities during the “college student weekend” (i.e., Thursday, Friday, and Saturday) is associated with greater alcohol consumption (Finlay, Ram, Maggs, & Caldwell, 2012).
College student alcohol use can have tremendous consequences, such as absenteeism, lower grades, injury, and death (Hingson, Zah, & Weitzman, 2009). Thus, understanding the social context of alcohol consumption may have important implications for risk-reduction efforts that target drinking norms and the peer group. Since socializing with peers and alcohol use are inextricably linked (Burk, van der Vorst, Kerr, & Stattin, 2011), it is critical to investigate the different types of social networks developed by college students in these social contexts during their casual leisure activities.

The current study examined a subset of students’ social networks which include the peers students choose to engage with during weekend activities. These types of networks have been labeled as recreational networks. Recreational networks may include friends and family or those who provide access or opportunity to engage in recreation (e.g. a classmate who is hosting a party). It is likely that college students vary in the composition of their recreational networks, and this variation could be captured in subgroups. The recreational network may be a type of network that influences the student’s ability to cope with the developmental challenges faced throughout college. Early work by Newcomb (1962) suggested that peer interactions are among the most potent influences on the student’s development, attitudes, and behavior.

As previously mentioned, friends or peer networks can influence individuals both in positive ways, by providing emotional support or a sense of belonging, or in negative ways, by endorsing heavy drinking (Reifman, Watson, & McCourt, 2006) and engaging in risky sexual activity (Bogle, 2008; Paul & Hayes, 2002). Additionally, these behaviors may result in unwanted sexual experiences (Flack et al., 2007). Therefore, the overview of the literature will next examine the research that has been conducted on college
drinking and risky sexual behavior (e.g. hooking-up), and on what is currently known about the role of network members play in each of these behaviors.

**Alcohol Use**

Heavy alcohol use represents a significant threat to public health in the U.S., specifically among young adult populations (Fromme & Corbin, 2004; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Wechsler et al., 2002). Approximately 76,000 deaths in 2001 were attributed to alcohol in the U.S. (Midanik, Chaloupka, Saitz, Toomey, 2004), while 4% of the global burden of disease is attributable to alcohol use (Room, Babor, & Rehm, 2005). Furthermore, more than 17.6 million Americans are estimated to meet the DSM-IV diagnostic criteria for an alcohol use disorder (American Psychiatric Association, 1993; Grant et al., 2004). Individuals who struggle with heavy alcohol use are typically at risk for a number of health conditions such as cancers, depressive disorders, cardiovascular disorders, and gastrointestinal disease (Room et al., 2005). Additionally, heavy alcohol use can lead to serious injury and death by either the people drinking or by others who surround them (Room et al., 2005).

The highest rates of problems with alcohol use typically occur among young adults, with the majority of problems occurring between the ages of 18-24 (Grant, Dawson, Stinson, Chou, Dufour, & Pickering, 2004; Schulenberg & Maggs, 2001). The typical college age range is 18-24, making college a potentially risky setting for drinking. Research has shown that many college students drink at least moderately (Meilman, Presley, & Cashin, 1997), reporting an average of 4-6 drinks on a given occasion.
Motivations for Alcohol Use in College

Students drink for a variety of reasons. Some of these reasons have to do with avoiding social costs (e.g. rejection by a valued group) or enhancing social settings (e.g. drinking with friends to have a good time) (Cooper, 1994). Therefore, students may drink to fit-in and conform to a particular social network. Thus, understanding the motivational processes is essential in understanding the social context for drinking behavior. Cooper (1994) proposed a four factor drinking motivation model that includes
a social element. In this proposed framework for categorizing drinking motives, individuals may drink to obtain a positive outcome (i.e., positive reinforcement) or to avoid a negative one (i.e., negative reinforcement). Likewise, drinking may be responsive to internal rewards (e.g., to manage one’s internal emotional state) and external rewards (e.g., to achieve social acceptance or approval). Cooper combined all of these dimensions to create four classes; 1) positively internally generated (enhancement motives), 2) positively externally generated (social motives), 3) negatively internally generated (coping motives), 4) negatively externally generated (conformity motives).

Two categories in this model relate to a social network’s influence on drinking behavior and are further explored below: 1) positively externally generated (social motives) and 2) negatively externally generated (conformity motives). Cooper (1994) defined social motives as drinking to obtain positive social rewards. This type of motive is most often associated with the specific social atmosphere like drinking with friends at a party or bar. Research has shown that these social contexts were the most common situations in which students reported their last heavy drinking event (Baer, 2002). Hence, a student would obtain positive social rewards from drinking with a particular social network or group of friends. Additionally, Cooper (1994) defined conformity motives as drinking to avoid social censure or rejection. Thus, students who are beginning to enter a particular social network may be more likely to conform to the network’s drinking norms to avoid getting kicked out of the group. Whether the motive is drinking to have fun with a group of friends or drinking to fit in, the social network plays a role.
Peer/Network Influence on Alcohol Use in College

Alcohol use among college students has been regularly attributed to peer (Baer, 2002) and network influences (Rosenbluth, Nathan, & Lawson, 1978; Rosenquist, Murabito, Fowler, & Christakis, 2010). Students often want to “fit in” and have a “sense of belonging” within a social network. Therefore, students may quickly attempt to make friends with other students. Alcohol is often used as a way to fit in and facilitate the rapid increase of intimate sharing within students’ networks (Burger & Koch, 2011). Students often cite social facilitation, a sense of belonging, and fitting in as important motives for drinking (Ichiyama & Kruse 1998; Johnson, Rodger, Harris, Edmunds, & Wakabayashi, 2005). Further, viewing alcohol as a way to facilitate social interactions is significantly associated with intentions to drink (Rimal & Real, 2005). For example, Hartzler and Fromme (2003) found that men who had a strong desire for affiliation tended to drink more heavily than men who did not have a strong desire for affiliation. In addition, students’ drinking seemed to increase to mirror perceived peer behavior in order to fit in.

Perceived peer norms of alcohol consumption also play a role in college student drinking (Borsari & Carey, 2006). Students are likely to use their social networks as referent groups, or sources for their perceived peer norms (Lewis & Neighbors, 2004; Lewis & Neighbors, 2006; Wechsler, Molnar, Davenport, & Baer, 1999). Perceived norms can be described as either descriptive or injunctive (Cialdini et al., 1991). Descriptive norms refer to the perception of others’ quantity and frequency of drinking, which are mostly based on observations of drinking. Injunctive norms refer to an
individual’s perceived approval from important others regarding drinking attitudes and behaviors (Borsari, Murphy, & Barnett, 2007). Students tend to overestimate both descriptive and injunctive norms. In other words, students believe that their peers are drinking more than they themselves do and that their peers are more approving of alcohol use than they actually are (Borsari & Carey, 2003). Cialdini and colleagues (1991) show that college students are more likely to engage in behaviors (e.g. smoking, drinking, studying, and exercising) perceived to be approved by others. Lewis and Neighbors (2004) sampled 226 college students to evaluate perceptions of gender-specific drinking norms versus gender non-specific drinking norms. Gender-specific norms refer to same-sex norms and other-sex norms, whereas gender-non-specific norms refer to drinking norms of a typical student with no reference to gender. College students overestimated the quantity and frequency of drinking among their same-sex peers, and perceived same-sex norms were more strongly associated with problematic drinking relative to gender-non-specific norms. Furthermore, perceived same-sex drinking norms were stronger predictors of alcohol consumption for women than for men. These findings indicated that perceptions of peer alcohol use influence a student’s actual alcohol use. If students perceive their peers and members within their social network to be drinking, they themselves are likely to drink. However, this relationship may be stronger based on gender of the peer and the type of relationship peers have with each other.

Social influence in the form of peer modeling is a strong and proximal predictor of alcohol use in college as well (Borsari & Carey, 2001; Callas, Flynn, & Worden, 2004). Peer modeling of drinking behavior can influence other college students to drink. College students are most likely to drink with friends and peers (Borsari & Carey, 2001),
thus, drinking is often modeled by peers within a person’s social network. This is consistent with Social Learning Theory (Bandura, 1977, 1986) which suggests that an individual’s behavior is influenced through a variety of group processes, including perceived and actual norms within a group, modeling behaviors, and peer support for engaging in a particular behavior. In regard to heavy drinking, modeling effects have been found to play a role. Caudill & Marlatt (1975) examined the effects of modeling on social drinking behavior among 48 male students who were categorized as heavy social drinkers. Each participant was exposed to one of six conditions: heavy modeling, light modeling, or non-modeling condition, accompanied by a brief social interaction with a lab assistant that was either emotionally cold or warm. Findings revealed that exposure to heavy drinking models were associated with increased consumption in students drinking in the company of that model; the social interaction did not affect drinking behavior. The peer influence, or modeling, effect tends to be strongest for men with a history of binge drinking compared to female binge drinkers and light drinkers of either gender (Baer, 2002).

The structure of a student’s social network also plays a role in his or her alcohol use. Rosenbluth and colleagues (1978) found that larger drinking groups in college were associated with greater alcohol consumption. More recently, Senchak and colleagues (1998) sampled 197 undergraduate students who used alcohol to some degree and asked them about their social drinking context; who they drank with and how much they drank. They found that men reported greater frequency of drunkenness in large groups of mixed-gender and small groups of same-gender compared to small mixed-gender groups. In contrast, women’s frequency of drunkenness was unrelated to gender mix or group size.
Results also indicated that women’s presence in small groups may moderate male alcohol consumption since men reported less frequency of drunkenness in small mixed-sex groups.

Since there is a dearth of literature on social network structure predicting alcohol use in college populations, an example on a non-college sample is provided to further elucidate the relationship between social networks and drinking. In a well-known network study (Rosenquist et al., 2010), alcohol consumption among individuals and others in their social network was highly correlated, meaning people who drink heavily were tied to others who drank heavily and people who abstained were tied to other abstainers. Rosenquist and colleagues examined the person-to-person spread of alcohol consumption over 32 years within a large social network (N=12,067) and found discernible clusters of drinkers and abstainers were present in the network at all of the time points. These clusters extended to three degrees of separation (e.g., to a person’s friends’ friends’ friends). They found that subjects were 50% more likely to drink heavily if a person they were directly connected to drinks heavily, whereas subjects were 29% more likely to abstain if they were directly connected to an abstainer. These bimodal effects suggested that social network effects have the potential to have both positive and negative consequences for alcohol consumption behavior. This study should be replicated on a college sample to test whether the same findings hold true in this setting. Regardless, it is clear that network structure plays a role in alcohol use.
Organized Group Membership and Alcohol Use in College

The next section will focus more specifically on the role that organized group membership plays on drinking. While Greek organization and athletic teams are not analyzed in the current study, they are two of the largest and most influential groups that encourage drinking in college. Thus, literature on Greek organizations and athletes are included in the review. Students who are members within these groups compared to non-members are at an increased risk for heavy episodic drinking and drinking related consequences (Borsari et al., 2007).

Greek Membership

Students who are members of the college Greek system are at an increased risk for heavy alcohol consumption. Relative to non-Greek members, Greek system members (particularly fraternities) tend to have more drinking problems (Borsari et al., 2007; Lichtenfield & Wesley, 1994) drink alcohol more frequently, engage in heavy episodic drinking, and report an increased number of alcohol-related negative consequences (Borsari & Carey, 1999; Borsari et al., 2007; Larimer, Turner, Anderson, Fader, Kilmer, Palmer, & Cronce, 2001; Meilman, Leichliter, & Presley, 1999; Presley, Meilman, & Lyerla, 1993; Wechsler, 1996).

Heavier drinking by fraternity members has been linked to several individual and environmental variables. Individual differences include drinking history (Larimer, Anderson, Baer, & Marlatt, 2000), more positive drinking expectancies (Cashin, Presley, & Meilman, 1998), and low motivations to alter drinking patterns (Johanson, Baer,
Kivlahan, Collier, & Marlatt, 1988). In a study by Cashin and colleagues (1998), increased positive drinking expectancies were found to be a significant difference between Greek and non-Greek members. Drinking expectancies are subjective beliefs about the extent to which alcohol will produce certain outcomes (Goldman, Brown, & Christiansen, 1987). These expectancies can be influenced by lived experiences, observations, peers, and individuals within a student’s social network. Furthermore, many alcohol related expectancies (indicated below) were related to the social network and how someone would enhance their social interactions through drinking. Cashin and colleagues analyzed data from 25, 411 students at 61 different universities who completed The Core Alcohol and Drug Survey. They found that students affiliated with the Greek system were more likely to believe many alcohol expectancies, such as beliefs that alcohol: 1) enhances social activity, 2) makes it easier to deal with stress, 3) facilitates a connection with peers, 4) facilitates bonding, 5) allows people to have more fun, 6) makes men and women sexier, and 7) facilitates sexual opportunity.

One area of research that has received little focus is whether students self-select into a drinking network or are influenced by the network to drink, or perhaps a combination of both. As networks develop, college students perceive themselves to be more similar in attitudes and values to other network members (Klausner, 2009). Therefore, the student could be changing his or her own behavior to become more similar to the behavior within the network. These kinds of peer effects are notoriously difficult to examine because in most contexts, people are able to choose with whom they associate. Therefore, while similarities in behavior among members of a group may be due to peer influence, it is difficult to disregard the possibility that network members may
be previously similar to each other and may have come together with the intention of achieving a similar outcome. One study by Grekin and Sher (2006) addressed this question by examining whether selection (choosing to join the Greek system) and socialization (the influence of the Greek environment) played a role in heavy drinking. The researchers sampled approximately 2000 students over three time points from the beginning of the freshman year into the fall to the following spring. They found that prior to college, students with more alcohol dependence symptoms were more likely to join a fraternity. Furthermore, Greek status continued to predict alcohol dependence symptoms suggesting an environmental effect of Greek involvement beyond selection effects attributable to prior alcohol involvement. Such research should further be explored on non-Greek groups of college students to examine whether students are selecting into drinking networks or are becoming socialized to drink.

As can be seen from the previous study, the Greek community may serve to maintain and promote drinking through environmental factors such as peer influence. Peer influence is comprised of inflated perceptions of the quantity, frequency, and acceptability of drinking within the Greek system as a whole (Larimer, 1992). On average, fraternity members view heavy drinking as a highly prevalent and acceptable behavior (Bosari & Carey, 1999; Cashin et al., 1998). Alcohol use is also seen as a positive aspect of house reputation and popularity (Larimer, Irvine, Kilmer, & Marlatt, 1997). Leaders in the Greek system often have increased influence over joining members and these leaders are often the heaviest drinkers on campus. They are also more likely than non-members to see alcohol use as a vehicle for friendship and social activity (Cashin et al., 1998), as can be demonstrated through the encouragement of alcohol use
during pledge week. During this time, fraternities and sororities systematically limit the social contact that pledges can have with non-members, thus forcing them into tight and intimate social groups. These pledges must earn a place within the organization by bonding with fellow pledges and current members. Alcohol is frequently used and encouraged by the Greek leaders during the pledge period to foster such bonding. Furthermore, failure to bond can result in rejection, hence not being admitted into the fraternity (Kuh & Arnold, 1993). While students in the Greek system are forced into tight and intimate social groups, it by no means indicates that they have small networks. For example, Greeks report having a larger network of friends than non-Greeks and the frequency of interacting with friends is significantly related to excessive alcohol use (Dorsey, Scherer, & Real, 1999).

Students that belong to the Greek system in college are often drinking more frequently and heavily than the non-Greek student population, thus increasing their risk for alcohol-related consequences. Greek students’ social networks often encourage increased drinking through peer influence, positive drinking expectancies, and role modeling of heavy drinking. While Greek members are at risk for increased drinking, they are not the only organized student group on college campuses with these unique drinking behaviors. Students who belong to an athletic team often drink in similar ways that are encouraged by their athletic social network.
**Athletic Team Membership**

Several national studies have found that college athletes consume more alcohol than their non-athletic team counterparts. For example, Wechsler and colleagues (1997) found that relative to non-athletes, a greater percentage of both male and female athletes reported heavy episodic drinking in the past two weeks, with the same pattern emerging in a different sample four years later (Nelson & Wechsler, 2001). For men, the difference was 61% for athletes versus 43% for non-athletes, and for women it was 50% versus 36%, respectively. To further highlight the distinction in drinking between athletes and non-athletes, Leichliter and colleagues (1998) found differences in the average number of drinks per week. Athletic team leaders reported an average of 8.25 drinks per week, team members reported an average of 7.34 drinks per week, and non-athletes reported an average of 4.12 drinks per week. Overall, athletic team members were consuming more alcohol as compared to the general student population.

Heavier drinking by athletic team members has been linked to several factors. College athletes may be more isolated on college campuses than other students; hence their athletic network may be on the periphery of the larger college network. They would be less likely to mix with non-athletes, and consequently this position within the network has been suggested to have a homogenizing effect on their thoughts and behaviors (Damm & Murray, 1996). As a result, many athletes may seek social support primarily from only those within the athletic community or network, and since athletes face unique challenges (e.g. public scrutiny), they may take greater stock in the opinions and behaviors of those who they believe face similar challenges (e.g. other athletes).
Therefore, athletes have been found to use other athletes within their social network as a referent group for drinking norms. For example, Martens and colleagues (2006) assessed the relationship between descriptive drinking norms among one’s closest friend who is not an athlete compared to peer athletes on personal alcohol use. They sampled 165 athletes who competed at the National Collegiate Athletic Association Division 1. Athlete norms demonstrated a stronger main effect on personal alcohol use compared to non-athletic norms. However, gender moderated this finding, such that athlete norms better predicted alcohol consumption among men, whereas the non-athlete norms better predicted alcohol consumption among women.

Students who belong to the Greek system or athletic teams typically drink more than their non-membered counterparts. Based on the literature presented, it is evident that membership within these networks is one of the contributing factors to their increased drinking through peer influences, lack of exposure to students who behave and think differently about alcohol, and peer modeling of drinking behavior. However, these are not the only students who drink heavily; therefore the context and patterns among students who do not necessarily belong to these groups are further examined.

**Drinking Patterns in College**

Clear drinking patterns among college students have been demonstrated in various studies. Some of these patterns are based on environmental factors such as days of the week, while others are related to social groups that college students belong to. The context in which students drink is extremely important when examining the association
between social networks and alcohol use. Students tend to drink with friends, on the weekends and in large social settings like parties and bars (Green, 2005; Karshin, 2001; Kraft, 1982;). In a study by Clapp and colleagues (2000), research staff interviewed 401 students about their drinking contexts. They found that typically, students’ last binge drinking events were in large social settings and lasted around five hours on the weekend. Furthermore, the researchers reported that in students’ last binge drinking event they drank with friends, roommates, and their partner or spouse. Students’ drinking patterns often correlate with these contexts, such that drinking is heavier at parties and large social events where students are often celebrating a holiday or cheering for their school’s football team. These parties and events typically take place during the weekend with their friends.

One pattern of concern is the increased alcohol consumption on specific social events like college football game days (Glassman, Dodd, Sheu, Riezo, & Wagenaar, 2010), since students at these events would be drinking with individuals who are in their social network. Neal and Fromme (2007) surveyed 541 students using web-based daily monitoring assessments and found drinking rates significantly increased an average of two drinks on football game days, whether they were home or away, compared to non-game days. High-profile football game days were among the heaviest drinking days as compared to other well-known drinking days such as New Year’s Eve or Halloween weekend. Neal and Fromme (2007) also found that men increased their drinking for all games whereas women who spent more time with friends were more likely to drink heavily during away games. Furthermore, for lighter drinkers (those who consumed around two drinks) away games were associated with a greater likelihood of behavioral
risks (e.g. drinking and driving, unsafe sexual behavior, sexual coercion) as their intoxication level increased. Glassman et al. (2010) termed this type of increased drinking on football game days Extreme Ritualistic Alcohol Consumption (ERAC). Specifically, Glassman and colleagues operationalized ERAC as consuming ten or more drinks on game day for males and eight or more drinks for female. They estimated that approximately 15% of college students engaged in ERAC.

Another pattern of concern is alcohol consumption on the weekend as compared to weekdays. Maggs and colleagues (2011) sampled 200 first-year students over ten weeks and found that students drank significantly more on the weekends than on weekdays. On average, students were 7.6 times more likely to drink heavily on the weekend (76%) compared to the weekday (48%). Furthermore, students were more likely to pass out on the weekend (29%) as compared to the weekday (14%). Peer influence also moderated the relationship between drinking on the weekday versus weekend. Students who joined the Greek system on campus drank more on the weekends compared to non-Greek members (Maggs et al., 2011).

Since college students often drink with friends on the weekend, it is important to examine drinking patterns that are related to weekend drinking, as these patterns may be directly or indirectly related to students’ social networks. For example, Turrisi and colleagues (2013), Mallet and colleagues (2011), Ray and colleagues (2012), and Jackson and colleagues (2001) have all found weekend drinking patterns associated with heavy drinking and drinking related risk behaviors, like playing drinking games. In a longitudinal study by Turrisi and colleagues (2013), latent class analysis and latent transitional analysis were used to identify subgroups of college students in regard to their
drinking and to examine how these students transitioned in and out of each class as a result of a parent-based alcohol intervention. Four subgroups were identified: 1) non-drinkers, 2) weekend light drinkers, 3) weekend heavy episodic drinkers, and 4) heavy drinkers. They found that the weekend light drinkers and the weekend heavy drinkers were more likely to transition into riskier drinking subgroups at later time points. For example, more than half of the weekend heavy episodic drinkers at baseline (i.e., summer before college) transitioned into heavy drinkers by the five-month follow-up and another 25% transitioned between the five-month follow up and the 15-month follow up. While social networks and peer influence were not specifically measured in this study, a link could be established between weekend drinking patterns, shifts between these patterns, and network influences in future studies. For example, friends could become more influential over time since they are likely to be drinking buddies on the weekend (Clapp et al., 2000) thus moving other students into heavier drinking patterns.

In another study, Ray and colleagues (2012) sampled 229 first year college students to examine drinking related protective and risk behaviors, alcohol use, and associated consequences. Latent profile analysis was used to group students based on protective and risky drinking behaviors. Protective behaviors included actions such as pacing drinks, setting limits, and walking home with a friend, whereas risky drinking behaviors included playing drinking games and drinking shots. Three profiles were identified: 1) high risk—those who rarely used protective behaviors and more frequently engaged in risky behavior; 2) mixed—those who engaged moderately in both; and 3) high protective—those who engaged less frequently in risk behaviors and more frequently in protective behaviors. Students who reported drinking 16 or more drinks per
a weekend were most likely to be in the high-risk group. Social networks and peer influences were not measured within this study; however, it has implications for social network research. Many of the protective and risky drinking behaviors were not purely based on the individual, but rather on the context the individual was in. Based on the literature, weekend drinking appears to be a typical pattern of drinking for college students, when they are more likely to be drinking with friends. However, this pattern of drinking is also associated with riskier drinking behaviors (Ray et al., 2012). Therefore, in the use of risky versus protective behavior students’ social networks could be an asset or a liability.

College students have distinct drinking patterns that typically occur in the accompaniment of friends and other individuals within their social network (Clapp et al., 2000). Understanding these drinking patterns and what influences them would inform future studies on the influence social networks have on college student drinking. Based on past research, alcohol consumption increases in contexts where drinking is normalized among friends, like parties and football games, (Glassman et al. 2010; Neal & Fromme, 2007) going out on the weekends, (Jackson et al., 2001; Maggs et al., 2011; Mallet et al., 2011; Ray et al., 2012; Turrisi et al., 2013) and belonging to Greek (Maggs et al., 2011) and athletic organizations (Martens et al., 2006). Since young people who attend college tend to engage in higher levels of alcohol use from their late teens through mid-20s than at any other age, this puts college students particularly at an increased risk for other risky health behaviors like unplanned sex. Survey results from a study showed that frequent binge drinkers were 7-10 times more likely to engage in unplanned and unprotected sex (Wechsler et al., 1994), which could be in the form of a hook-up.
Hook-up Culture in College

One of the most recent trends on college campuses is the hook-up culture. This “no strings attached” sexual encounter is becoming normative and encouraged in many social circles (England et al., 2008; Paul & Hayes, 2002; Paul, McManus, & Hayes, 2000). An aspect of hooking-up that has received much attention is the lack of a universal definition. College students themselves cannot agree on what hooking-up is and the term itself implies some ambiguity in conversations between friends. A hook-up broadly refers to an uncommitted sexual encounter. Glenn and Marquardt (2001) define a hook-up as “sex without commitment” in which a heterosexual\(^1\) pair gets together for sex without any expectations for the future. Paul and colleagues (2000) have defined a hook-up as a “sexual encounter which may or may not include sexual intercourse, usually occurring on only one occasion between two people who are strangers or brief acquaintances” (p. 76).

Regardless of the exact definition used, hooking-up is part of the college experience for many and encompasses three major characteristics: 1) the individuals are not explicitly in a traditional romantic relationship (i.e., not dating or boyfriend/girlfriend), 2) there are no a priori agreements regarding what sexual behaviors will occur, and 3) there is no promise of any subsequent intimate relations or a relationship (Stinson, 2010; Bogle, 2008). Furthermore, a hook-up can involve a wide variety of sexual behaviors ranging from heavy kissing, petting, oral sex, anal sex, mutual masturbation, and/or intercourse (Garcia & Reiber, 2008).

\(^1\) Hooking-up is a term used to describe sexual behaviors among heterosexual, bisexual, and homosexual individuals. However for the purpose of their study Glenn and Marquardt defined hooking-up within the context of sexual behaviors among heterosexual individuals.
The specific prevalence rates of hooking-up vary from campus to campus. Approximately 53-76% of students have reportedly hooked-up in one form or another (Paul & Hayes, 2002), with experiences most commonly occurring at parties, dorms, fraternity houses, bars, and clubs (Paul & Hayes, 2002) where alcohol is usually available. Moreover, hook-ups typically occur with someone who is known, like a friend or acquaintance (Paul & Hayes, 2002; Paul et al., 2000; Stinson, 2010).

**Motivations to Hook-up**

As with drinking, students engage in sexual behavior like hooking-up for a variety of reasons. In 1998, Cooper and colleagues extended the four-factor drinking motives model to explain why people engage in sexual intercourse; particular risky sexual intercourse (i.e., hooking-up) which, in turn, can contribute to unwanted sexual experiences, rape, and sexual assault (Abbey et al., 1996; Testa et al., 2010). Cooper’s categories remained the same (see Motivations for Alcohol Use in College) for sexual motivations. The two categories examining a social element are further explored. Conformity motives were defined as engaging in sexual behavior to avoid social censure (e.g., using sex to escape, avoid, and minimize negative social experiences). Therefore, students are engaging in sex because their friends are having sex and they do not want their friends to think less of them, or because they want to avoid negative reactions from a potential partners (Cooper et al., 1998). Social motives for engaging in sexual behavior are defined as using sex to enhance social connections. Consequently, students may hook-up to make an intimate connection with another person (Cooper et al., 1998).
Therefore, what is motivating the hook-up could be an attempt to connect intimately with someone in the network, since hook-ups usually occur with friends or acquaintances.

**Peer/Network Influence on Hook-ups**

Some research has linked hooking-up to social norms and peer groups (Bogle, 2008; Lambert, Kahn, & Apple, 2003; Paul & Hayes, 2002). More often than not, hooking-up is encouraged within the students’ social network, even if that student is uncomfortable with the idea of hooking-up for him or herself. While the prevalence of hooking-up ranges from 53-76%, students estimate that 85% of their peers have hooked-up (Paul & Hayes, 2002). The idea of wanting to belong and fit in with one’s peer group leads to college students conforming to what they perceive the norm to be, despite having contradictory personal attitudes and beliefs (Bogle, 2008). In other words, the perception that “everyone is doing it” may lead students to start hooking-up themselves. In a study conducted by Lambert and colleagues (2003), 136 female and 128 male college students from a southeastern university answered questions regarding their own comfort level with hooking-up and their perceived peers’ comfort level. They found that male students were more comfortable with hooking-up than female students were; however, both females and males rated their same-gender peers and other-gender peers as being more comfortable engaging in hook-up behaviors like kissing, petting, oral sex, and penetrative sex than they themselves were. This evidence suggests college students have misperceptions about peers’ sexual behavior that ultimately can influence their own sexual behavior.
While some students hook-up with random unknown people, the majority of hook-ups often involve someone that the student is familiar with (Paul & Hayes, 2002; Paul et al., 2000; Stinson, 2010)—a person in their social network, such as a friend, classmate, or other students with whom they would have some kind of social tie. This suggests students choose to hook-up with partners with whom they feel some sense of security and/or familiarity (Stinson, 2010). Little is known about the structural influence of a social network on hooking-up as there is a dearth of literature examining this structure beyond what is known about peer norms and perceived peer behavior. However, research indicates that peer processes are extremely important in examining hook-up behavior and that further research in the area of peer network influences is needed.

In order to further elucidate the potential influence of social network structures on hook-ups, a study exploring network influence on romantic relationships is examined. Sprecher and Felmlee (2000) examined social network approval on relationship transitions with a sample of pre-marital romantic couples at a Midwestern university. Network data were collected from the couples up to 5 times over the course of 5 years. The average age of participants was 20 years at the start of the study. Results indicated that perceptions of network approval, specifically from the male partner’s friends, tended to increase over time for the participants whose relationships remained intact throughout the duration of the study. Also, the transitions to engagement and to marriage were associated with an increase in network approval from the male’s friends. Furthermore, individuals who experienced a break-up reported more network approval for the break up rather than approval for maintaining the relationship. A final result indicated that the
likelihood of experiencing a breakup was significantly lower if women received more network approval from their friends. Since intimate relationships begin, develop, and are maintained, changed, and dissolved within a larger environment like a person’s social network, there is reason to hypothesize that a student’s social network would influence their sexual behavior.

**Alcohol Use and Hooking-up**

While the idea of hooking-up seems to have been normalized across college campuses, many students still may not be completely comfortable participating in this behavior. This may lead to increased alcohol consumption prior to a hook-up event. Alcohol use is strongly associated with casual sexual behavior, like hooking-up. For example, Desiderato and Crawford (1995) found that the frequency and quantity of college students’ alcohol consumption was associated with their number of sexual partners over the previous 11 weeks. In other words, students who consumed alcohol more frequently and in greater quantities tended to have more sexual partners. Green (2005) sampled college students to explore the reasons that they engaged in sexual behaviors after drinking. Results indicated that students drank because it made hooking-up easier, particularly for female students. In a more recent study, Fielder and Carey (2010) measured alcohol use as a potential predictor of hooking-up in a sample of 140 first semester college students. Students were assessed twice, once at the beginning of the fall semester and once at the end of the fall semester. For all participants, peak
intoxication level\(^2\) predicted oral sex and vaginal sex hook-ups. Furthermore, psychological distress increased after female students had a penetrative sexual hook-up, but this finding was not consistent for males. Fielder and Carey (2010) also examined the characteristics of hook-ups in an all-female sample (n=118). Women reported an average of three drinks prior to a hook-up encounter, although 64\% of participants had at least one drink. Almost all the hook-ups involved kissing (98\%), and 27\% of the hook-ups involved oral and/or vaginal sex.

In order to fully grasp the role that social networks have on alcohol use and sexual behavior, alcohol’s indirect effect on sexual behavior must be explored. One factor that has been explored is alcohol expectancies. As noted previously, expectancies are subjective beliefs about the extent to which drinking alcohol will produce certain outcomes (Goldman, et al., 1987), and they can be influenced by one’s social network. Therefore, one’s social network not only directly affects behavior, but it can also affect the beliefs that influence behavior. Some of these outcomes have to do with post-drinking sexuality; both men and women expect alcohol to enhance their own sexuality and the sexuality of others (George & Stoner, 2000). Specific sex-related alcohol expectancies include; 1) drinking people are more sexually available, 2) drinking helps people to become more sexually aroused, 3) people who drink are more sexy, 4) people

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\(^2\) Peak intoxication level was assessed using peak blood alcohol content (BAC) in the past month. Participants indicated the number of standard drinks (i.e., a 10–12 oz. can or bottle of 4–5% alcohol beer, a 4-oz. glass of 12%-alcohol table wine, a 12-oz. bottle or can of wine cooler, or a 1.25-oz. shot of 80-proof liquor either straight or in a mixed drink) they had on their heaviest drinking day in the past month and how many hours passed from the beginning of the first drink to the finishing of the last drink (Carey et al., 2006). Peak intoxication level was calculated using the formula BAC = [(drinks/2) * (GC/weight)] - (.016*hours), where (1) drinks = number of standard drinks consumed, (2) GC = gender constant (9.0 for females and 7.5 for males), (3) weight = weight in pounds, and (4) hours = number of hours over which the drinks were consumed (Matthews & Miller, 1979).
who drink have more sexual intent, 5) drinking will enhance sex, 6) drinking will disinhibit sex and 7) drinking increases sexual responsiveness (George, Stoner, Davis, Lindgren, Norris, & Lopez, 2006). Expectancies can also influence the perception of others, specifically males’ perceptions of females. Generally, men perceive women’s behavior and communication more sexually than women do when the man and/or the woman are drinking (Koukounas & Letch, 2001). For example, in vignette experiments comparing drinking versus non-drinking persons, the drinking person is expected to be more sexually available and willing to engage in sex. This applies more specifically to drinking women rather than to drinking men (George, Cue, Lopez, Crowe, & Norris, 1995). When people have certain beliefs about alcohol, which influence their perceptions of others, they are more likely to act on those beliefs and perceptions. This can include an increase in the likelihood of engaging in sexual behavior. For example, Dermen and Cooper (2000) conducted an event-based study of 308 college students, where the students were asked about their most recent sexual encounter, alcohol consumption, expectances, and related drinking perceptions. Results indicated that students who consumed alcohol and held strong beliefs about alcohol’s effects on sexual risk taking (e.g. after drinking I am less likely to take precautions before having sex) were more likely to have intercourse on a first date than those who did not (Dermen & Cooper, 2000).

Given that hooking-up encounters are partly attributable to excessive alcohol consumption, sex-related alcohol expectancies, perceptions, and conforming to social network norms, it is possible that many students are engaging in sexual experiences they do not desire (Paul & Hayes, 2002). Flack and colleagues (2007) found that one-third of
female college students experience some form of unwanted sex (usually under the influence of alcohol) and, of this group, 78% of the unwanted sexual encounters took place during a hook-up. Further, Paul and colleagues (2000) found that approximately 15% of college students felt pressured during a hook-up encounter. While students drink to facilitate a hook-up (Karshin, 2001; Lambert et al., 2003; Paul & Hayes, 2002), this behavior may also place students at risk for unwanted sexual experiences (Abbey et al., 1996; Testa et al., 2010).

Unwanted Sexual Experience in College

While this dissertation does not address unwanted sexual experiences directly in the analyses, it is important to understand the broader implication that can result from risky alcohol use and hooking-up. Thus, a thorough review of unwanted sexual experiences in college is included.

Unwanted sexual experiences and other forms of sexual aggression towards women are more common and more serious than is often realized. For example, unwanted sex and sexual assault are extremely common on college campuses (Abbey, 2002). Female students are at a high risk for experiencing some form of unwanted sex throughout their college years. For example, Flack and others (2008) found that 44 percent of their female college sample experienced unwanted sex. In comparison, men’s college years coincide with the period of their greatest likelihood of committing rape
Studies have found that between 15-25 percent of male college students initiate an unwanted sexual experience (Malamuth, Sockloskie, Koss, & Tanaka, 1991)\(^3\).

Similarly to operationalizing the term “hooking-up,” there is extensive variation in the definition of unwanted sex. Unwanted sexual experiences encompass a variety of behaviors that can be consensual or nonconsensual and can include experiences referred to as regretted sex, aggressive sex, incapacitated sex, sexual assault and rape. In order to better conceptualize these terms, Koch and colleagues (2008) sampled 273 college students at a mid-Atlantic university to explore their definitions for and contexts in which regretted sex, unwanted sex, sexual aggression, sexual victimization, and incapacitated sex are perceived to occur. They found that approximately 70% of students thought that regretted sex was something they wished they had not done. However, a small portion of the sample perceived regretted sex to mean a negative experience (14.6%), or if the sex ruined the friendship (7.3%). Students perceived regretted sex to occur when consuming alcohol, during a hook-up, being pressured, coerced, or during non-consensual sexual activity. Unwanted sex was defined by participants in different ways based on gender. Approximately 50% of men defined unwanted sex as unwanted but willing, being guilted into sex, or feeling pressured, whereas only 15% of women defined unwanted sex in a similar way. The majority of females (46.2%) defined unwanted sex as unwanted and unwilling (forced and non-consensual), whereas only 24% of males used the same definition. The majority of men (48.5%) and women (43.8%) perceived unwanted sex to

\(^3\) It is important to note that unwanted sexual experiences happen to people of all genders and are perpetrated by people of all genders. However, the majority of the reporting of such experiences and the research on such experiences has focused on heterosexual relationships in which men are the perpetrators and women are the victims.
occur while consuming alcohol. Other situations where unwanted sex was perceived to occur was during a hook-up or when forced or raped. Sexual aggression was mainly defined as being forced sex; however other definitions included consensual aggressive/rough sex, or flirting. The majority of students (males=34.9% and females=28.8%) perceived sexual aggression to occur during a rape, or while consuming alcohol (males=18.6% and females=23.3%). The majority of participants defined sexual victimization as forced sex, sexual assault and rape. Some defined sexual victimization as being harassed. Females (41.1%) and males (35.3%) perceived sexual victimization to occur during a rape, while being harassed (males=34.9% and females=26.0%), and when consuming alcohol (males=17.7% and females=12.3%). Finally, incapacitated sex was defined by the majority of participants as nonconsensual and being drunk or drugged. However 10% of men defined this term as being unable to perform. Similarly, most students perceived incapacitated sex to occur while consuming alcohol (65%) and during a rape (11%).

Yet in most of the literature, wanted sex is often treated as consensual and unwanted sex is treated as nonconsensual. However some researchers are beginning to challenge this assumption. In a study conducted by Peterson and Muehlenhard (2007), 164 college women were sampled in order to better conceptualize the “wantedness” of consensual and nonconsensual sex. They found that sex can be unwanted and consensual, for example giving into a partner to bring more intimacy and emotional connection to the relationship. They also found that sex can be wanted and nonconsensual (e.g. wanting sex in the beginning but then passing out from alcohol consumption, thus being unable to consent to further sexual activity). This research
indicates that unwanted should not be used synonymously with nonconsensual sex but rather as two distinct, but sometimes coinciding, phenomena.

It is also important to note that these concepts are defined differently depending on the laws of each state. Some states have broadened the language that defines rape as penetration or attempted penetration due to force and/or threat, lack of consent, or inability to provide consent based on the victim being incapacitated or intoxicated (Seidman & Vickers, 2005). Other states have a more specific approach where laws differentiate degrees of sexual assault and rape especially when it comes to sexual assault and rape due to intoxication depending on whether the offender intentionally intoxicated the victim (Koss, Abbey, Campbell, Cook, Norris, Testa, … & White, 2007). Legally, sexual assault includes a full range of forced sexual acts including forced touching or kissing, verbally coerced intercourse, and vaginal, oral, and anal penetration (Abbey, 2002). Typically, verbal coercion is operationalized as verbal pressure, manipulation, and/or threats placed on the victim for the purpose of engaging in sexual behavior (Abbey, 2002). As demonstrated, there is extensive variability in the definitions of regretted sex, unwanted sex, aggressive sex, sexual victimization, sexual assault, rape, and what it means to consent. Therefore, terms need to be clearly operationalized for not only participants, but also for those conducting research.

While there is variation in the literature and law as to what constitutes an unwanted sexual experience, for the purposes of this study unwanted sexual experiences refer to a wide range of sexual behavior from unwanted touching to penetration. These unwanted sexual experiences can occur under situations that involve verbal threats or coercion, physical force or threats, and sex through confirmed or suspected drug-
facilitated by alcohol and/or other drugs, and other types of incapacitation (e.g. while asleep or unconscious) (Krebs, Lindquist, Warner, Fisher, & Martin, 2009). All unwanted sexual experiences denote nonconsensual sexual activity that was unwanted at some point during the sexual interaction.

The impact an unwanted sexual experience has on its victims makes it a serious public health problem. Rape victims are at an increased risk for various mental disorders including depression and suicidal ideation/attempts (Kilpatrick, Edmunds, & Seymour, 1992; Ruggiero, Smith, Hanson, Resnick, Saunders, Kilpatrick, & Best, 2004; Tjaden & Thoennes, 2006). Some rape victims have reported experiencing acute symptoms (e.g. nausea, diarrhea, dizziness, numbness, fatigue, headaches, and back/joint/abdominal pain), chronic diseases (e.g. hypertension, diabetes, allergy, dermatitis) and somatic symptoms affecting their reproductive organs and sexual well-being (e.g. premenstrual distress, sexual anhedonia and anorgasmia) at an increased rate compared to females who had not experienced rape (Walker, Gelfand, Katon, Koss, Von Korff, Bernstein, & Russo, 1999). Hence, unwanted sexual experiences can have a long lasting negative impact on physical health (e.g. chronic disease) (Walker et al., 1999) and psychological well-being (e.g. depression) (Tjaden & Thoennes, 2006).

**Alcohol Use and Unwanted Sexual Experiences in College**

Numerous factors converge to place college women at risk for unwanted sexual experiences. One of the primary risk factors for unwanted sexual experiences is heavy alcohol use. Numerous sources implicate alcohol use as either a cause of or a contributor
to sexual assault (Abbey, Ross, McDuffie, & McDuffie, 1994; Abbey, 2002; Benson, Charlton, & Goodhart, 1992; Koss, Dinero, Seibel, & Coz, 1988; Muehlenhard & Linton, 1987; Norris, Nurius, & Dimeff, 1996). Abbey and colleagues (1998) conducted a study on college students and found that in 81% of alcohol-related sexual assaults both the perpetrator and victim had been drinking. Abbey (2002) found similar results and reported that at least 50% of sexual assaults involved the use of alcohol or other drugs by the perpetrator, victim, or both. In another study using a national college sample, Koss and colleagues (1988) found that 74% of perpetrators and 55% of rape victims had been drinking preceding the incident. Norris and colleagues (1996) found that estimated peak blood alcohol level in college students during the last 30 days was correlated with having unwanted sexual experiences. In a comparison of sexually assaultive heterosexual dates and non-assaultive dates, Muehlenhard and Linton (1987) found that binge drinking by both the man and the woman was significantly more likely to occur during dates that were sexually assaultive. In a longitudinal study, Parks and colleagues (2008) collected data from female students (N=886) during their first two years in college. They found that women who abstained from drinking alcohol were less likely to experience sexual victimization as compared with drinkers. Further, women who engaged in binge drinking were much more likely to report negative consequences such as sexual victimization. Other studies have yielded similar findings, suggesting that as females consume more alcohol their risk of an unwanted sexual experience increases (Parks et al., 2008; Testa & Hoffman, 2012).

Several qualitative studies have also found a link between unwanted sexual experiences and alcohol consumption in college. As described in the previous section,
Koch and others (2008) found that alcohol use was a common thread when students described various types of negative sexual experiences. The majority of students stated that regretted sex, unwanted sex, sexual aggression, and incapacitated sex were more likely to occur under the influence of alcohol. In another study conducted at a mid-Atlantic university Burger and Koch (2011) interviewed freshman students in order to examine the impact of emerging freshman social networks on hooking-up, alcohol use and unwanted sexual experiences. Findings revealed that men use alcohol to not only pressure women into sex, but also to make it easier. One female student stated, “The guy’s pressure, mixed in with you being so drunk, is just a given that you cannot say no…I’ve seen girls that are so gone and I can see how it happens. The guy can so easily take advantage of someone who has no idea what’s going on in their mind.”

Further, consuming alcohol can impair cognitive and motor abilities, thus making it more difficult for women to recognize or avoid danger (Norris et al., 1996). Men may target women who are drinking because they perceive them to be more sexually available (Corcoran & Thomas, 1991; Palmer, McMahon, Rounsaville, & Ball, 2010). Men may also encourage women to drink in order to more easily facilitate a sexual encounter or to take advantage of them. This increased risk may result indirectly from the finding that drinking typically occurs in social settings like bars and parties which, due to increased drinking, pose a risk for unwanted sexual experiences. The majority of college students drink with people in their social networks, and unwanted sexual experiences occur subsequently from drinking in these social settings. This may make it particularly difficult for women to identify risk even within their social networks due to their impaired cognitive and motor abilities (Norris et al., 1996).
College students’ beliefs surrounding alcohol use and sexuality, also known as sex-related alcohol expectancies, similarly contribute to unwanted sexual experiences. Many students have false expectancies that using alcohol increases positive sexual feelings and arousal. Male students perceive a woman who is drinking to be more sexually available so that they can more easily have sex with her compared to a woman who is not drinking (Corcoran & Thomas, 1991; Palmer et al., 2010). These expectancies about the sexual availability of women who drink lead some men to believe that these women are appropriate and even acceptable targets for sexual aggression, assault, and rape. Furthermore, some college males have reported purposefully getting a date drunk in order to justify sexually aggressive behavior (Abbey et al., 1996).

Some studies have indicated that the transition into college along with alcohol use may place women at an increased risk for experiencing an unwanted sexual experience. College women, especially during this transition, are particularly at risk for unwanted sexual experiences (Krebs et al., 2009); with one in five young women experiencing a rape situation some time during her college career (Fisher, Cullen, & Turner, 2000). Another vulnerable time period, known as the “red zone,” refers to the first six to eight weeks of the freshman semester. It is often a student’s first chance to live away from home and many use this new found freedom to experiment with heavy alcohol use while engaging in risky sexual behavior (Ostrander & Schwartz, 1994). Flack and colleagues (2008) found that 44% of their female college sample experienced unwanted sex during the Red Zone time period. Of those who experienced unwanted sex, 71% of the incidents involved alcohol, 40% involved partners well-known to the women, and 98% involved partners who were fellow students.
Differences in how men and women drink can affect their risk levels for certain negative consequences like unwanted sexual experiences. Typically, undergraduate men report higher rates of binge drinking than undergraduate women (Johnston, O’Malley, & Bachman, 2000). For example, McCabe (2002) sampled 2,041 students using a web-based survey. Students were asked about their experiences with heavy episodic drinking, drinking motivations, living arrangements, GPA, and past problematic behaviors due to drinking. McCabe (2002) found that sophomore, junior, and senior male undergraduates had higher rates of binge drinking compared to male freshman students. Whereas, the reverse trend was true for females; upper-class undergraduate female students drank significantly less than first year female undergraduates. This finding is in line with some sexual assault research that suggests the greatest likelihood for rape and sexual assault to occur among women in college is during their freshman year (Flack et al., 2008) when they appear to be drinking increased amounts of alcohol (McCabe, 2002).

**Peer/Networks and Unwanted Sexual Experiences**

Sexual assaults in college frequently involve a man and a woman who have been drinking alcohol and interacting socially (Abbey, Zawacki, Buck, Clinton, & McAuslan, 2004). Women who are sexually assaulted by a friend or acquaintance are often reluctant to resort to physical resistance initially due to the complexity of the situation and difficulty in processing environmental cues that did not appear to be dangerous (Ullman & Knight, 1993). Women may let down their guard with their friends since they may be more likely to feel a sense of security. As a result, women may be less likely to use
protective behaviors compared to situations where they are surrounded by strangers. In a qualitative study conducted by Farhi (2010) women found it difficult to believe that a friend or even an acquaintance could force sex on them. Many women, especially when alcohol was involved, did not blame their friend (the perpetrator). One woman states, “…personally I do not consider it to be assault, I don’t really blame the guy because the guy involved was a good friend.” Another woman talks about how she initially felt safe with a friend and called him to help her when she was drunk, “…I was raped by a boy who I was friends with. I had had too much to drink and was alone so I called one of my friends who picked me up, and instead of driving me home he drove me to his apartment…” This qualitative study elucidates that women are shocked and surprised when someone they know sexually assaults them and this may make it difficult for them to determine who they can and cannot trust.

Women in these situations typically weigh the implications and repercussions of their own responses in regard to their acquaintance’s or friend’s sexual motivations (Ullman & Knight, 1993). One such repercussion could be the negative impact that her disclosure may have on the dynamics of her social network. The qualitative study conducted by Farhi (2010) in which female students were interviewed about their past unwanted sexual experiences exemplifies this point. One of the key findings was that the support, or lack thereof, of the victimized female students’ social networks played a role in whether the experience was discussed or reported. A student stated, “I didn’t want to get my friend in trouble with a serious allegation like rape though I realize now that he raped me.” Another student told her friends about the experience and they weren’t as supportive as she would have liked. Her friends did not think she was raped since she
and the perpetrator were acquainted. Another student’s social network blamed her for the rape because she let him walk her home. These findings exemplify that not only is the perpetrator usually in the victim’s social network, but that one’s social network can drastically change (e.g. being blamed by friends for rape) after an unwanted sexual experience.

In future research it is important to study the structure of social networks, alcohol use, and hooking-up in order to improve existing interventions aimed at reducing unwanted sexual experiences among college women. The current study attempts to achieve this by examining students’ weekend recreational networks and their associations with drinking and hooking-up.

Conclusion of Review

The influence that social networks have on the relationships among alcohol use, sexual behavior (“hooking-up”), and unwanted sexual experience is still unclear. However, certain aspects of these relationships are better understood in the way they contribute to female college students’ risk for unwanted sexual experiences. These include heavy alcohol use by both perpetrator and victim, heavy alcohol use which is usually influenced by group membership (i.e., Greek or athletic teams), peer norms, contexts in which network members are most likely to encourage drinking (i.e., weekends, and football game days), expectancies around alcohol use and sex, and the interactions among; 1) alcohol use and transitioning to college, and 2) alcohol use and hooking-up. While the current study does not address the issue of unwanted sexual
experiences directly in the analyses, it is important to understand the broader relationships between these phenomena. Thus, the research questions addressed by this dissertation will lead to a better understanding of the interrelationships between networks, alcohol use, and hooking-up, as well as changes that occur within networks from Thursday to Friday night.
Chapter 3

Methodology

The purpose of this study was to use repeated measures data from, The Recreational Activities of College Students Study, in order to identify and capture the temporal complexities of network characteristics as they relate to drinking alcohol and engaging in hooking-up among a sample of college students over the period of a weekend. This chapter will present the theoretical framework used to guide the development of this study as well the methods and procedures used.

Theoretical Model

The theoretical model used to guide the development of the research study, The Recreational Activities of College Students, was informed by The Theory of Planned Behavior (Ajzen, 1991, 2002). In addition, many substantive studies on alcohol use, sexual behavior, and network dynamics (Armitage & Conner, 1999; Baer, 2002; Bogle, 2008; D’Amico & McCarthy, 2006; Korcuska & Thombs, 2003; LaBrie, Kenney, Mirza, & Lac, 2011; Park, Sher, Wood, & Krull, 2009; Paul & Hayes, 2002) contributed to the development of the theoretical model. It is important to note that not all aspects of the theoretical model are analyzed in the current study, however current analyses were informed by the theoretical model.
The Theory of Planned Behavior

A common theoretical approach used to examine a variety of behaviors among college students has been the Theory of Planned Behavior (Ajzen, 1991, 2002). The Theory of Planned Behavior broadly states that attitudes toward drinking, subjective norms around drinking, and perceived behavioral control influence intentions to drink, which in turn influence drinking behavior. Perceived behavioral control can also directly influence behavior. Intentions to perform a given behavior (e.g. drinking) are assumed to capture the motivational factors that influence that behavior. They indicate how much effort people plan to exert towards performing a certain behavior (e.g. moderate drinking as compared to heavy episodic drinking). Attitudes towards drinking are an expression of one’s positive or negative evaluation of drinking, and the perceived subjective social norm reflects personal perception of the social expectation to adopt drinking. Perceived behavioral control reflects personal beliefs regarding how easy or difficult performing the behavior is likely to be, reflecting external (e.g. availability of time, money, social support) and internal (e.g. ability, skill, information) factors (Armitage & Conner, 1999). Studies have shown that positive attitudes toward alcohol use, higher perceived norms of others’ drinking, low perceived control over drinking behavior, and higher intentions to drink are all predictors of risky drinking among college students (Baer, 2002; LaBrie et al., 2011; Park et al., 2009). Some research has also linked sexual behavior, like hooking-up, to social norms and peer groups (Bogle, 2008; Lambert et al., 2003; Paul & Hayes, 2002).
A variety of factors influence an individual’s attitudes, perceived norms, perceived behavioral control, and intentions towards drinking and sexual behavior in college populations. For example, a key factor in the initiation, escalation, and de-escalation of alcohol use among young adults involves the influence of peer networks (D’Amico & McCarthy, 2006). More specifically, peer groups influence an individual’s drinking norms, attitudes toward alcohol use, perceived drinking control, and their intentions to drink (D’Amico & McCarthy, 2006). Other studies have also demonstrated that norms among close friends have a strong influence on self-reported drinking and sexual behaviors (Bogle, 2008; Korcuska & Thombs, 2003). In other words, network members may influence the behavior of other members within the group by encouraging the drinking of alcohol and/or engagement in hooking-up behavior (Wenzel, Tucker, Golinelli, Green & Zhou, 2010).

**The Recreational Network**

The term “social network” is broad and is defined as a set of actors (i.e., individuals) and a set of relations or ties that connect them (Wasserman & Faust, 1994). Many researchers look at particular characteristics of those who make up a person’s social network (e.g. friends, family, and acquaintances) and the types of relations that connect them (e.g. trust, similarity, and likability) (Smith & Christakis, 2008). For the purpose of this study, the researcher is interested in a subset of students’ social networks which includes individuals that students choose to engage with in weekend activities, or their recreational networks. The recreational network may be a type of network that
encourages or discourages risk-taking behaviors. For example, when students go out in larger-mixed-gendered networks, they are at a higher risk for reporting drunkenness compared to smaller same-gendered networks (Rosenbluth et al., 1978; Senchak et al., 1998). Furthermore, when students are connected to other students who drink they are also at an increased risk for drinking themselves (Rosenquist et al., 2010). While certain network characteristics like size and gender composition are associated with drinking behavior, a more comprehensive structure of these recreational networks is unknown. Thus, the identification of students’ recreational networks and the association to drinking and hooking-up is tested in the current study (See Figure 3-1).

Figure 3-1. Tested Pathway.
Methods and Procedures

Institutional Review Board Approval

The study, Recreational Activities of College Students, was approved by the Institutional Review Board at the Pennsylvania State University for a two year period beginning March 23rd, 2012.

Research Design

The present study included a secondary analysis of data from the Recreational Activities of College Students Study—a prospective repeated-measures study conducted at Penn State in 2012. The full study design is described below.

Data Collection

Participants

Participants included 435 undergraduate students enrolled at the University Park campus of the Pennsylvania State University. Students were recruited from general education classes within two different departments, communication and health, during the spring (n=69), summer (n=228), and fall (n=138) semesters of 2012. General education courses are classes that are common to all degrees across campus and make up one-third of students’ required course work. Therefore, the sample was composed of students from
various majors across the university and not only from the two departments. Eligible participants were those who: (a) attended these general education courses, (b) were 18 years of age or older, and (c) volunteered and consented to participate.

Of the 435 participants enrolled in the study, the demographics were as follows: 66% female, 71.4% Caucasian, 8.4% Asian, 11.3% Black, 3.4% Hispanic and 5.5% multiracial/other. The average age for all participants was 19.8 years ($SD = 1.71$), with participants ranging from ages 18 to 26. In addition, 56% of the sample was below the legal drinking age of 21. The majority of participants identified as straight or heterosexual (95.4%) with the remaining 4.6% identifying as gay, lesbian, or bisexual. Demographic characteristics of the sample were comparable to the larger student population in regard to racial/ethnic makeup and age (Admission Statistics, 2012). There were roughly 20% more females within the sample than in the university population; however, having a 60% female sample is typical of the college population, as females are more likely to participate in research than males (Laska, Pasch, Lust, Story, & Ehlinger, 2009; Porter & Whitcomb, 2005).

**Recruitment**

Students were recruited from three types of general education courses: Effective Speech (CAS100a), Introduction to Health and Human Sexuality (BBH 146), and Human Sexuality as a Health Concern (BBH 446). Students enrolled in these general education courses were recruited as participants because they are representative of the diversity in majors and backgrounds of the student population at Penn State. Participants were
recruited using different protocols for each department, although all prospective participants were offered an alternative assignment (See Appendix A) to taking the survey in order to avoid undue influence. All students received classroom extra credit for study participation or for completing the alternative assignment. All professors were blinded to students that participated in the study and those who completed the alternative assignment.

Students from the communication class ($n=228$, females =129) were recruited via their pre-established research protocol, in which the subject pool administrator assigned students randomly to studies that were approved to be conducted that semester. The students assigned to this study were asked to connect to an online survey hosted by C-IKNOW (Huang, Contractor, & Yao, 2008) through the subject pool online system. Students consenting to participate were then forwarded to the online survey where they created their own user ID and password for subsequent logins. All students assigned to the study by the subject pool administrator accessed and completed the online survey resulting in a 100% response rate. Students from the biobehavioral health classes ($n = 207$, females = 157) were recruited through classroom announcements, where they were notified that a survey link would be emailed to them along with a randomly generated username and password which they were prompted to change upon login to the survey. A key with the username and student information was stored separately from the data and was used to assign extra credit. Sixty-seven percent of invited students provided consent and accessed the online survey.

Comparison of survey volunteers to non-volunteers showed no difference in race/ethnicity or grade earned in the course, although proportionally more females than
males accessed the survey. Chi-square analyses revealed no significant differences between students in the health and communication classes in regard to age and network characteristics (discussed in more detail within the Analytic Strategy section) analyzed in the current study. Thus, the data from the two classes were combined for further analyses.

**Procedure**

The Recreational Activities of College Students Study consisted of six waves of data collection throughout the spring, summer, and fall semesters of 2012. Each wave of data collection contained different students that completed an online survey of the course of three days during the weekend; Friday (Time 1), Saturday (Time 2) and Sunday (Time 3). Data were collected using the same procedures during each of the six weekends. Students accessed the online survey, Hooking-Up and Drinking Social Network (HUDSoN) Questionnaire (See Appendix B). The HUDSoN was developed in order to assess norms, attitudes, beliefs, and intentions towards alcohol use and sexual behavior and to collect data on students’ recreational networks (See Appendix C for a table depicting the question type and variable at each time point). Once students accessed the online survey (HUDSoN), beginning on Friday, they answered questions about their previous night’s behavior and their recreational networks. Upon entering the online survey, students were presented with the informed consent document and were asked to agree or disagree with the consent document (See Appendices D and E). Participants who agreed were then directed to the survey. Participants who disagreed were directed to
the end of the screen that thanked them for their time. All participates who accessed the survey did complete some portion of the questionnaire. In order to encourage more accurate recall of the previous evening’s behavior, participants were asked to consider the timeframe from 6:00 pm of the previous evening until they went to sleep that night. Participants identified people in their recreational network by pseudonym only. They were asked to create pseudo "names" for each individual with whom they hung out.

Procedures remained the same during each of the six data collection weekends, which included two weekends in the spring (n=18, n=51), two weekends in the summer (n=99, n=129), and two weekends in the fall (n=76, n=62). One of the fall weekends was a football weekend (n=62). Therefore, analyses were conducted in order to determine any differences between students’ responses across the six weekends. Chi-square analyses comparing student responses across the six weekends did not reveal any significant differences in the students’ drinking, hooking-up behavior, and network characteristics. There may have been differences between the networks, the experience of drinking, and hooking-up on a football weekend compared to the other weekends. However, this undetected difference could be due to the small number of students who completed the survey during the football weekend compared to the other five weekends. These specific variables are discussed in greater detail in the Analytical Strategy.
Instrumentation

HUDSoN

Prior to data collection, the “Hooking-Up and Drinking Social Network (HUDSoN) Questionnaire” was designed using information from 1) an extensive literature review, 2) established instruments, and 3) a qualitative pilot study.

Qualitative Pilot Research. A qualitative pilot study was used to examine students’ social transitions from high school into college. For this study, twelve students were interviewed about making friends, drinking, hooking-up, and negative consequences of drinking (including sexual assault and rape) during their first semester at the university. These qualitative data were then analyzed using Grounded Theory Methods (Strauss & Corbin, 1997). Findings were used to create pertinent and accurate answer choices for some of the questions on the HUDSoN (Burger & Koch, 2011). Such items included: 1) where students meet people for the first time (i.e., at class, dorm social, party, in an academic program for freshman students, sorority/fraternity, relative/family member, hometown before college, dorm, online, dating service, other), 2) activities they engaged in during the evenings (i.e., exercise, eat, study, organized social activity, apartment/dorm party, fraternity/sorority party, organized meeting), and 3) roles that network members fill (classmate, friend, romantic partner, relative, professor, graduate student, coach, drinking buddy, smoking buddy (cigarettes), acquaintance, study buddy). Findings also identified key variables related to the strength of relationships between network members (i.e., 1) level of trust, 2) level of liking, 3) level of wanting to be liked,
4) level of comfort, and 5) level of similarity). Finally, the qualitative study helped to identify appropriate word usage that was then integrated into the HUDSoN.

**HUDSoN**. The HUDSoN included two parts. The first part contained questions on behaviors, norms, intentions, and attitudes towards alcohol use and sexual behavior. The second part contained an ego (personal) social network inventory that examined with whom students were hanging out, characteristics of those individuals within the participant’s network, the multi-dimensional relationships network members had with each other, and the behaviors in which the participant and the network members engaged. Details of the HUDSoN are provided below.

The first part of the HUDSoN includes 57-items. The following is a brief description of the scales used to measure the variables of interest.

1) **Demographics (Questions 1-6, 117)**. Students were asked 7 items. These items included: age, gender, sexual orientation, class standing, census group, class students were recruited from and whether students’ were a transfer or international student.

2) **Social Maven Scale (Questions 7-21)**. A 15-item, self-report questionnaire was used to assess the influential ability of the participants (Boster, Kotowski, Andrews, & Serota, 2011). Highly influential people are thought to have one or more of three distinct characteristics. They may be well connected, persuasive, an expert or maven, or have some combination of the three. Therefore the items on the survey included five connectivity items, five persuasiveness items, and five health maven items. In order to assess the reliability, construct validity, and content validity of the measure, Boster and colleagues (2011) conducted three studies and found that these
indices measure what they purport to measure and that they do it with a high internal consistency reliability, \( \alpha \) ranged from 0.87 to 0.93.

Drinking Intentions, Norms, Attitudes, Perceived Behavioral Control (Questions 22-29). The following questions are based on a measure developed by Park and colleagues (2009) to assess intentions to drink, drinking norms, attitudes towards drinking, and perceived behavioral control towards drinking. Park and colleagues (2009) found the measure to be both highly valid and to have high internal consistency with Cronbach’s alpha ranging from 0.81 to 0.97.

3) Drinking Intentions (Q 22). One item was used to assess how many drinks participants intended to drink each night over the study period of three days.

4) Drinking Norms (Qs 26 and 28-29). Three items were used to examine subjective, university descriptive, and university injunctive norms.

5) Attitudes toward Drinking (Qs 24-25). Two items were used to assess whether participants found that drinking would help them to have fun.

6) Perceived Behavioral Control towards Drinking (Qs 23 and 27). Two items assessed whether students felt confident and had control over the amount they intended to drink.

Hooking-up Intentions, Norms, Attitudes, Perceived Behavioral Control (Questions 30-56). Following the measure established by Park and colleagues (2009), the following items were developed to assess intentions to hook-up, hooking-up norms, attitudes towards hooking-up, and perceived behavioral control towards hooking-up. Hooking-up was comprised of three separate sexual behaviors, making-out, oral sex, and penetrative sex (Burger & Koch, 2011), therefore participants were asked the same set of
questions for each of the sexual behaviors that comprised the construct “hooking-up.”

The measure was found to have high content validity by the researcher and Cronbach’s alpha was calculated to determine internal consistency for each of the constructs measuring “hooking-up.” Cronbach’s alpha was .86 for indices measuring making out, .88 for oral sex, and .86 for penetrative sex.

7) Hooking-up Intentions (Qs 30, 39, and 48). Three items were used to assess if participants intended to hook-up with someone over the study period of three days.

8) Hooking-up Norms (Qs 32-33, 37-38, 41-42, 46-47, 49, 52, and 55-56). Twelve items were used to examine subjective, university descriptive, and university injunctive norms.

9) Attitudes toward Hooking-up (Qs 31, 36, 40, 45, 50, and 54). Six items were used to assess whether participants had hooked up to have fun.

10) Perceived Behavioral Control towards Hooking-up (Qs 34-35, 43-44, 51, and 53). Six items assessed whether students felt confident and had control over hooking-up.

The second part of the HUDSoN includes 60-items that collected data on participants’ social networks through a social network inventory. For the purpose of this study only ego (personal) network data were gathered. Ego networks are collected using a personal network research design. This type of research design involves sampling a collection of unrelated participants (egos) and asking them about people in their lives (alters) (Halgin & Borgotti, 2012). There are specific elements required for a social network inventory of ego network data which are name generators and name interpreters.
(Burt, 1984). Name generators are questions designed to collect names of network members based on a specific relationship (Gerich & Lehner, 2006). Demographics and other properties of the alters are collected by questions called name interpreters, which are repeatedly presented to the participant, separately for each network member that the participant lists (Gerich & Lehner, 2006). In this study, a name generator was used so that participants were asked to list people they hung out with on the previous night using pseudonyms (alters). Respondents were asked a series of name interpreter questions to provide demographic data on each of their network members, characteristics of those individuals within the participant’s network, the perceived multi-dimensional relationships network members have with each other, and the behavior the participant and the network members engaged in that evening. The format of this personal network inventory was constructed similarly to others that have been used (Davey-Rothwell, Latimore, & Latkin, 2011; Japuntich, Leventhal, Piper, Bolt, Roberts, Fiore, & Baker, 2011; Marsden, 1990; Piper, Smiths, Schlam, Fiore, Jorenby, Fraser, & Baker, 2009; Wagner, Iverson, Wong, Bloom, McNelley, Davison…& Lankenau, 2013). Thus, the specific questions for Part Two were as follows:

11) Demographics of the Alters (Questions 57-61). Students were asked 5 demographic questions about each of the alters they listed. These items included: age, gender, class standing, census group, and whether students’ were a transfer or international student.

12) Characteristics of the Alters (Questions 62-65). Students were asked 4 questions in order to establish basic characteristics of the alters. The items were created based on the analyses from the qualitative interviews previously described and from a
Social Network Interview (Japuntich et al., 2011; Piper et al., 2009). These items include: 1) living proximity to the ego, 2) where the participant initially met each alter, 3) how the participant first met each alter, and 4) the nature of the relationship between ego and the alter.

13) Relational Characteristics of the Alters (Questions 66-71). Participants were asked 6 questions in order to establish the strength and closeness of the relationship between the participant and his or her alters. The items were created based on the analyses from the qualitative interviews previously described. These items include: 1) amount of time they spent with each alter during the evening, 2) level of liking, 3) level of wanting to be liked, 4) level of comfort, 5) level of similarity, and 6) level of trust.

14) The Mos Social Support Survey (Questions 72-80). The Mos Social Support Survey contains four functional support scales: 1) emotional/informational, 2) tangible, 3) affectionate, and 4) positive interaction (Sherbourne & Stewart, 1991). Items from the Mos Social Support Survey were modified to fit the format of a social network inventory. For each night, participants were asked which of the alters provided various types of social support and which of the alters provided various types of social support to each other. Sherbourne and Stewart (1991) found that these indices measure what they purport to measure and that they do it with a high internal consistency reliability, all Alphas >.91.

15) Perceived previous night’s behavior of alters (Questions 81-86, 88, 90, 92, 94-95, 97-98, 100-101, 103-104, 106-107). Participants were asked 19 questions in order to identify a variety of behaviors that may have taken place during the evening while the participant was embedded within his or her network. Participants were asked which of
his or her alters engaged in various behaviors and which of his or her alters engaged in behaviors with each other.

15a) The items (Questions 81-86, 88, 90, 92) were created based on the analyses from the qualitative interviews and from the personal network inventories previously described (Davey-Rothwell et al., 2011; Japuntich et al., 2011; Marsden, 1990; Piper et al., 2009; Wagner et al., 2013). These items include: 1) whether there was a fight or argument, 2) what activities were engaged in during the evening, 3) which alters started and/or ended the night with the participant, 4) the perceived amount of alcohol each alter consumed, 5) whether the alters smoked cigarettes, and 6) whether the alters did any other drugs.

15b) The next set of items (Questions 94-95, 97-98, 100-101,) were based on the previously described set of questions that examined hooking-up intentions, norms, attitudes, perceived behavioral control. As previously described, hooking-up was comprised of three types of sexual behavior; making out, oral sex, and penetrative sex. Questions were worded to examine whether these behaviors took place between the participant and any of the alters and if the participate perceived these behaviors to take place between any of the alters.

15c) The final set of items within this category examined whether any unwanted sexual experiences occurred between the participant and the alters or were perceived to occur between any of the alters (103-104, 106-107). These questions were based on items from the Revised Sexual Experiences Survey (R-SES) (Testa, Hoffman & Livingston, 2010). Similar to the R-SES, unwanted sexual experiences were examined
by categories of behavior. The R-SES has been used extensively in previous research and is a highly valid and reliable instrument (α=.84) (Testa, et al., 2010).

16) Previous night’s behavior of participant (Questions, 87, 89, 91, 93, 96, 99, 102, 105). Participants were asked 8 questions in order to identify a variety of behaviors that the participant engaged in. These questions are similar to items described previously. Items include: 1) amount of alcohol participant consumed, 2) whether the participant smoked cigarettes, 3) whether the participant did any other drugs, 4) whether the participant hooked-up, and 5) whether the participant had an unwanted sexual experience.

17) Past experiences and general health behaviors (Questions 108-116). This final set of questions includes drinking behaviors, cigarette smoking behaviors, and sexual history.

17a) Three items from the Alcohol Use Disorder Identification Test (AUDIT) (Saunders, Aasland, Babor, & Grant, 1993) to assess drinking behaviors (Questions 108-110). These include: 1) how often the participant drinks, 2) typical amount of alcohol consumed, and 3) how often the participant engages in heavy episodic drinking. The AUDIT has been used extensively in previous research and is a highly valid and reliable instrument, with test/retest reliability ranging from α=.68-.80 (Dawson, Grant, Stinson, & Zhou, 2005).

17b) Two items assessed broad smoking behavior of the participant (Questions 111-112). Items were based on the analyses from the qualitative interviews and from the personal network inventory (Japuntich et al., 2011; Piper et al., 2009) previously
described. The items examine how often the participant smokes at least one cigarette daily and how often the participant smokes cigarettes when they consume alcohol.

17c) Four items are used to assess the sexual history of the participant (Questions 113-116). Items are specified to distinguish past hooking-up behavior from sexual behavior with emotional commitment.

**Analyzed Variables**

The following six network items from the HUDSoN were used in the current analyses since they have been shown, in previous research (Borsari & Carey, 2006; Dulucchi, 2008; Lau-Barroco & Collins, 2011; Park, et al., 2009; Reifman, et al., 2006) and in the pilot study, to play a role in the drinking and hooking-up behavior of college students (Burger & Koch 2011).

*Network size.* Network size was assessed as the number of people each participant was with during Friday night (6:00pm to sleep).

*Network gender diversity.* Network gender diversity included the extent to which the network was homogenous or heterogeneous based on gender.

*Drinking buddy in network.* Participants were also asked to identify the type of relationship they had with each network member, particularly if there was a drinking buddy in the network.

*Activities engaged in with network members.* Participants were asked which activities they engaged in with each of their network members on Friday night. They picked from a variety of activities including: eating, dorm or social event, dorm or
apartment party, sorority or fraternity party, exercising, and studying. Data were then
dichotomized into engaging in riskier activities which are predictive of alcohol related
problems in college (e.g., sorority/fraternity party and dorm or apartment party) (McCabe,
Cranford, Morales, & Young, 2006; Park et al., 2009) or engaging in neutral activities
(e.g., eating, dorm or social event exercising, and studying)

Trust in network members. The perceived amount of trust between the participant
and network members was measured since it was found to play an important role in
drinking and hooking-up in friendship groups in the qualitative results. Participants were
asked how much they trusted each network member, using a 5-point Likert scale from
“not at all” to “completely.” These data were then dichotomized into trusting all network
members completely and not completely trusting all network members.

Age of network members. Age of network members was assessed by asking the
participant to identify what age range each network member belonged to. Data were
dichotomized based on the legality of drinking to younger than 21 and 21 and older
(indicating accessibility to alcohol).

The following two variables from the HUDSoN (i.e., drinking and hooking-up)
were also included in the current analyses.

Alcohol consumption. Participants reported the number of alcoholic drinks they
consumed on Friday night, using a scale ranging from 0-10 or more drinks. Responses
were transformed into z-scores to aid interpretability of results.

Hook-up. Participants were asked if they hooked-up with anyone on Friday night,
with behaviors ranging from kissing to penetrative sex. Hooking-up was defined as
kissing, having oral sex, or having penetrative sex with someone to whom there was no
emotional commitment. If a student engaged in any of these behaviors, it was coded as a hook-up.

**Analytic Strategy**

The purpose of the current study was to identify and capture the temporal complexities of network characteristics as they relate to drinking alcohol and engaging in sexual behaviors (e.g. hooking-up) among a sample of college students over the period of a weekend. Therefore, latent class analysis (LCA) was used to identify the subgroups of recreational networks. Latent transition analyses (LTA) was used to examine the transitions participants make between the subgroups of recreational networks across time.

**Analytic Strategy for RQ 1 and RQ 2**

RQ 1: What network profiles (latent class structures) represent the variation in recreational networks among college students?

RQ 2: Are college students’ drinking and hooking-up behaviors associated with particular recreational networks?

In the current study, LCA was used to identify subgroups of recreational networks based on participants’ responses to six recreational network indicators from the HUDSoN (described in more detail below). The responses to these variables were coded into binary variables (see Table 3-1). In order to determine the optimal number of latent classes, relative fit indices (AIC and BIC), entropy, parsimony, the likelihood-ratio $G^2$, 

```
and model interpretability were used (Collins & Lanza, 2010; Lanza et al., 2007). Lower AIC and BIC indicated a better model fit, whereas entropy closer to one indicated that participates were assigned to their appropriate class. Once the appropriate number of classes were identified, item response probabilities were used to ensure that each subgroup was distinguishable from one another, no subgroup had a near-zero probability of membership, and a meaningful label could be assigned to each subgroup. All analyses were conducted using PROC LCA in SAS (Lanza et al., 2007; Lanza, Dziak, Huang, Xu, Collins, 2011), which produces maximum likelihood estimates for parameters using the EM algorithm.

**Recreational Network Indicators (LCA)**

Table 3-1 displays the frequencies of the recreational network indicators used in the current analyses.
Table 3-1. Indicators for Latent Class Analysis (N=435)

<table>
<thead>
<tr>
<th>Indicators [name]</th>
<th>Code</th>
<th>Label</th>
<th>n</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network size</td>
<td>1</td>
<td>3 or fewer network members</td>
<td>208</td>
<td>77.6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4 or more network members</td>
<td>60</td>
<td>22.4</td>
</tr>
<tr>
<td>Gender network diversity</td>
<td>1</td>
<td>Group same gender</td>
<td>169</td>
<td>65.5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Group mixed gender</td>
<td>89</td>
<td>34.5</td>
</tr>
<tr>
<td>Drinking buddy in network</td>
<td>1</td>
<td>No drinking buddy</td>
<td>172</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>One or more drinking buddies</td>
<td>86</td>
<td>33.3</td>
</tr>
<tr>
<td>Partying with network members</td>
<td>1</td>
<td>Engaging in neutral activities with all network members</td>
<td>131</td>
<td>50.2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Engaging in risky activities (party, fraternity or sorority party) with at least one network member</td>
<td>130</td>
<td>49.8</td>
</tr>
<tr>
<td>Trust network members</td>
<td>1</td>
<td>Trust all network members completely</td>
<td>118</td>
<td>46.1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Not completely trusting all network members</td>
<td>138</td>
<td>53.9</td>
</tr>
<tr>
<td>Legal age of network members</td>
<td>1</td>
<td>All network members less than 21 years</td>
<td>101</td>
<td>40.4</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>At least one network member 21 or older</td>
<td>149</td>
<td>59.6</td>
</tr>
</tbody>
</table>

In regard to the second research question, two covariates (i.e., drinking and hooking-up) were included as predictors of class membership within the LCA. Conceptually, the LCA model was regressed onto drinking and hooking-up behavior. Alcohol consumption was a continuous variable and was first transformed to a z-score to aid interpretation by producing standardized logistic regression coefficients (Lanza et al., 2007), whereas hooking-up was dichotomous. Both variables were then used to show that participants who consumed alcohol and/or had a hook-up were more likely to belong to a particular network profile (Borsari & Carey, 2001; Cooper, 2002; Paul & Hayes, 2002).
Analytic Strategy for RQ 3 and R Q4

RQ 3: How do students’ recreational networks change from Thursday to Friday night?

RQ 4: How are college students drinking and hooking-up behaviors associated with changes in the students’ recreational networks?

Latent transition analysis (LTA) was used to examine how students’ recreational change from Thursday to Friday night. In the current study, recreational networks were modeled at each time as a categorical latent variable indicated by the same six indicators used to address RQ 1 and RQ 2 (Table 3-2). Three sets of parameters were estimated. First, *item-response probabilities* represent the probabilities of each item response conditioned on latent status membership (i.e., likelihood that students in a recreational network class endorsed an item). Measurement parameter values that are close to 0 or 1 indicate that the recreational network latent variable is well measured within that item. The item response probabilities were fixed to be equal at both time points. The second set of estimated parameters describes the probability of *membership in each latent status* (i.e., sub-group of recreational network) at each time point. Third are *transition probabilities*, which show the probability of transitioning from one latent status (i.e., recreational network sub-group) on Thursday to another latent status (i.e., recreational network sub-group) on Friday. Analyses were conducted in SAS using PROC LTA (Lanza & Collins, 2008; Lanza et al., 2011).
Recreational Network Indicators (LTA)

The same six indicators were used in the LTA analyses as the LCA analyses. As previously mentioned these variables have been shown in previous research and from the qualitative study to play a role in the drinking and hooking-up behavior of college students. Table 3-2 displays the frequencies of these recreational network indicators across Thursday (Time 1) and Friday (Time 2) night.

Table 3-2. Indicators for Latent Transition Analysis (N=435)

<table>
<thead>
<tr>
<th>Indicators [name]</th>
<th>Code</th>
<th>Label</th>
<th>n (Time 1)</th>
<th>n (Time 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network size</td>
<td>1</td>
<td>3 or fewer network members</td>
<td>236</td>
<td>208</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4 or more network members</td>
<td>154</td>
<td>60</td>
</tr>
<tr>
<td>Gender network diversity</td>
<td>1</td>
<td>Group same gender</td>
<td>219</td>
<td>169</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Group mixed gender</td>
<td>162</td>
<td>89</td>
</tr>
<tr>
<td>Drinking buddy in network</td>
<td>1</td>
<td>No drinking buddy</td>
<td>252</td>
<td>172</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>One or more drinking buddies</td>
<td>88</td>
<td>86</td>
</tr>
<tr>
<td>Partying with network members</td>
<td>1</td>
<td>Engaging in neutral activities with all network members</td>
<td>284</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Engaging in risky activities (party, fraternity or sorority party) with at least one network member</td>
<td>112</td>
<td>130</td>
</tr>
<tr>
<td>Trust network members</td>
<td>1</td>
<td>Trust all network members completely</td>
<td>100</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Not completely trusting all network members</td>
<td>167</td>
<td>138</td>
</tr>
<tr>
<td>Legal age of network members</td>
<td>1</td>
<td>All network members less than 21 years</td>
<td>129</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>At least one network member 21 or older</td>
<td>191</td>
<td>59.6</td>
</tr>
</tbody>
</table>
In order to address the fourth research question, two covariates were added into the LTA model to examine the effect of alcohol consumption and hooking-up on the transition probabilities. These were the same two covariates used in previously mentioned LCA model. The probability of latent status transitions was regressed on the two covariates in order to examine their effects on the likelihood of transitioning from one status to another.

To examine the role that alcohol use and hooking-up played in associations with transitioning the researcher used analytic procedures similar to Cleveland and colleagues (2012). Thus, hypothesis testing was performed by comparing the fit of nested models, first with and then without each covariate (i.e., drinking or hooking-up). Two times the difference in log-likelihood values between the models with and without the covariates (i.e., drinking and hooking-up) is a likelihood ratio test (LRT) statistic and follows a chi-square distribution. A significant difference in LRT values indicated that removal of the specific covariate resulted in a worse fitting model and the covariate should be retained. On the other hand, a non-significant difference in LRT values indicated that removal of the specific term did not worsen model fit, and thus, the more parsimonious model without the covariate was preferred.

These analyses focus on transitions to the recreational networks that represent the highest risk. Thus, these associations were modeled using regression to examine the effect of drinking and hooking-up on transitioning to (or remaining in) a risky recreational network on Friday night compared to all other statuses. These coefficients were exponentiated and transformed into easily interpreted odds ratios.
Missing data

In both LCA and LTA missing data on indicators are handled with the EM algorithm that considers data to be missing at random. This estimation procedure allows for missing data on all indicators (i.e., network items) but not on the covariates included in the models. Toward this end, preliminary analyses were conducted on the covariates to eliminate bias due to missingness. Participants with missing data on drinking and hooking-up items were more likely to be older and drink more often at the time 1 assessment. However, there were no differences in missingness by gender.
Chapter 4

Results

The purpose of this study was to identify and capture the temporal complexities of network characteristics as they relate to drinking alcohol and engaging in sexual behaviors (e.g., hooking-up) among a sample of college students over the period of a weekend. To achieve this purpose, this study analyzed data that was collected as part of a study entitled, “The Recreational Activities of College Students Study.” The portion of the questionnaire (HUDSoN) that was analyzed for this study included data on students’ recreational networks and their hooking-up and drinking behavior. First, descriptive statistics on drinking and hooking-up are described. Then, latent class analysis and latent transition analysis were conducted, addressing each of the four research questions.

Descriptive Statistics on Drinking and Hooking-Up

Students reported a range of drinking behavior from the previous night. Forty-nine percent of students did not drink any alcohol on Friday night, while the remaining students consumed alcohol ranging from 1 to 10 or more drinks. Of the students who reported drinking on Friday night, approximately 34.4% \((n=99)\) of those students engaged in heavy episodic drinking (HED\(^4\)). Students also reported on whether they had hooked-up the night before. Twelve percent \((n=35)\) of the students engaged in a hook-up on Friday night (See Table 4-1).

\(^4\) HED is considered 4 or more drinks for women and 5 or more drinks for men in one sitting or on one occasion (Wechsler et al., 2002)
In order to further explore the association between drinking and hooking-up, a series of crosstabulations and chi-square statistics were performed (Table 4-2). First, the researcher dichotomized the variable of drinking to see if consuming alcohol was associated with hooking-up on Friday night. Of the 35 students who engaged in a hook-up, 31 of those students had something to drink. Results of the chi-square test showed that there was a significant relationship between drinking and hooking-up, \( X^2(1, n=285)=21.16, p <.001 \). Next, the variable drinking was dichotomized on the basis of binge drinking to further explore this relationship. Of the 35 students who engaged in a hook-up, 27 (77%) had four or more drinks (i.e., binge drinking). Thus, another chi-square test was conducted, which showed a significant relationship between binge drinking and hooking-up, \( X^2(1, n=285)=29.66, p <.001 \). Overall, there was a strong relationship between drinking and hooking-up, where students who hooked-up were likely to not only be drinking, but binge drinking.
Table 4-2. Drinking and Hooking-up Crosstabulations (n=286)

<table>
<thead>
<tr>
<th></th>
<th>Hook-up</th>
<th>No Hook-up</th>
<th>Chi Square</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drink</td>
<td>31</td>
<td>116</td>
<td>21.161</td>
<td>.272*</td>
</tr>
<tr>
<td>Not Drink</td>
<td>4</td>
<td>135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binge Drink</td>
<td>27</td>
<td>73</td>
<td>29.66*</td>
<td>.323*</td>
</tr>
<tr>
<td>Not Drink or</td>
<td>8</td>
<td>178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderately Drink</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.001

Results for RQ 1

RQ 1: What network profiles (latent class structures) represent the variation in recreational networks among college students on a weekend night?

Fitting Latent Class Models

Fit statistics were compared between models that contained two to five classes (See Table 4-3).

Table 4-3. Comparison of Latent Class Models

<table>
<thead>
<tr>
<th>Number of classes</th>
<th>$G^2$</th>
<th>AIC</th>
<th>BIC</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>72.49</td>
<td>98.49</td>
<td>145.27</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>49.94</td>
<td>89.94</td>
<td>161.91</td>
<td>43</td>
</tr>
<tr>
<td>4</td>
<td>37.78</td>
<td>91.78</td>
<td>188.94</td>
<td>36</td>
</tr>
<tr>
<td>5</td>
<td>32.03</td>
<td>100.03</td>
<td>222.38</td>
<td>29</td>
</tr>
</tbody>
</table>

*Note. Boldface type indicates the selected model. AIC= Akaike's Information Criterion; BIC= Bayesian Information Criterion; df= degrees of freedom
Based on model interpretability, indices of fit (AIC and BIC), parsimony, and the likelihood $G^2$, the three-class model best fit the data. Specifically, the model with three profiles of weekend recreation networks had the lowest AIC values and well-differentiated classes that captured meaningful differences in social network structures. Table 4-4 presents the parameters for the three-class solution, where probabilities are given for the likelihood of code 2 for the indicators (shown in Table 3-1 within the Methodology Chapter). Percentages that reflect the number of participants likely to be in a given profile are based on the participants who responded in Table 3-1. As previously mentioned in the Analytic Strategy section, PROC LCA produces maximum likelihood estimates for parameters using the EM algorithm. Missing data on indicators is handled with the EM algorithm, which considers data to be missing at random. This estimation procedure allows for missing data on all indicators (i.e., network items) but not on the covariates used to answer the second and fourth research questions. Thus, item-response probabilities (Table 4-4) can be interpreted based on the full sample of 435 participants.
Table 4-4. Item-Response Probabilities for Three-Class Given Latent Class Membership (N=435)

<table>
<thead>
<tr>
<th>Latent Class Characteristics</th>
<th>Risky Partiers (RiskP)</th>
<th>Restrictive Partiers (RP)</th>
<th>Restrictive Non-Partiers (RNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger network</td>
<td>0.82</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Mixed-gendered Network</td>
<td>0.73</td>
<td>0.37</td>
<td>0.04</td>
</tr>
<tr>
<td>Drinking buddy in network</td>
<td>0.68</td>
<td>0.28</td>
<td>0.14</td>
</tr>
<tr>
<td>Not trusting network members</td>
<td>0.83</td>
<td>0.55</td>
<td>0.32</td>
</tr>
<tr>
<td>Going to a party with network members</td>
<td>0.78</td>
<td>0.63</td>
<td>0.19</td>
</tr>
<tr>
<td>Legal age of network members</td>
<td>0.75</td>
<td>0.88</td>
<td>0.25</td>
</tr>
</tbody>
</table>

*Note:* Percentages reflect the number of participants likely to be in each profile. Cells contain the likelihood of reporting answers coded as 2 in Table 1. Likelihoods over 50% have been bolded.

Latent Class Characteristics

The final three-class solution, which included six indicators, revealed distinct and interpretable classes. As seen in Table 4-4, there were distinguishable indicator response patterns for each of the latent classes. Class characterizations based on the indicator responses are described below.

Class 1 (Risky Partiers, 26.7%).

These students had a high probability of going to a party with network members (.78) that included at least one drinking buddy (.68). This subgroup also showed a high
probability of having a larger network (.82) and not trusting network members (.83). The probability of having a mixed-gendered network (.73) and network members above the age of 21 (.75) was relatively high as well. Based on their response patterns, these college students have weekend recreational networks that are stereotypical of the partying college student and that place them at risk for alcohol misuse and risky sexual behaviors (Armstrong, Hamilton, & Sweeney, 2006; Sher & Rutledge, 2006). Therefore, this subgroup is identified as “Risky Partiers.”

**Class 2 (Restrictive Partiers, 34%).**

This subgroup of weekend recreational networks was characterized by going to a party with network members (.63), having network members above 21 years (.88), and not trusting their network members (.55). Yet this subgroup showed a near zero probability of having a larger network (.01) and going out with a drinking buddy (.28). Further, the probability of having a mixed-gendered network was relatively low as well (.37). Based on their response patterns, these college students go to parties with network members but are more restrictive about who is in their weekend recreational network. Therefore, they are identified as “Restrictive Partiers.”

**Class 3 (Restrictive Non-Partiers, 39.3%).**

For these students, the probabilities of going to a party (.19) and having a drinking buddy in their network (.14) were both relatively low. This subgroup also showed a near
zero probability of having a larger (.01) and mixed-gendered (.04) network. These students also had a low probability of not trusting their network (.32) and having legal drinking-aged network members (.25). In summary, this subgroup appeared to represent college students who are restrictive about who is in their recreational network and who participate in other activities on weekends rather than go to parties. Therefore, they are identified as “Restrictive Non-Partiers.”

**Results for RQ 2**

RQ 2: Are college students’ drinking and hooking-up behaviors associated with particular recreational networks?

**Drinking, Hooking-up, and Recreational Networks**

The Restrictive Non-Partiers served as the reference group for the covariate analysis (Lanza et al., 2007). Table 4-5 shows the beta parameters for the effect of each covariate as well as the odds ratios of belonging to a particular class. Odds ratios express how likely an individual is to be in a particular group, relative to the reference group. An odds ratio equal to 1.0 corresponds to independence of the two variables. An odds ratio < 1.0 indicates that as the covariate values increases, a person is less likely to be in that particular group, compared to the reference group. An odds ratio > 1.0 indicates that as the covariate increases, a person is more likely to belong to that particular group rather than the reference group.
Table 4-5. Covariate analysis with the Restrictive Non-Partiers as the reference group (n=286)

<table>
<thead>
<tr>
<th></th>
<th>Alcohol Consumption</th>
<th>Hook-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>B</td>
</tr>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Risky Partiers</strong></td>
<td>6.75</td>
<td>.91</td>
</tr>
<tr>
<td><strong>Restrictive Partiers</strong></td>
<td>.127</td>
<td>-2.06</td>
</tr>
</tbody>
</table>

114.14* 9.26*

*p<.05

As previously mentioned within the Analytic Strategy section, alcohol consumption is a continuous variable, which has been z-scored, and hooking-up is a dichotomous variable. Participants who reported drinking more alcohol Friday night (when they recalled it Saturday morning) were 6.75 times more likely to be Risky Partiers compared to Restrictive Non-Partiers. For example, for every 1SD increase in drinking behavior, students were 6.75 times more likely to be Risky Partiers compared to Restrictive Non-Partiers. Therefore, students who are average drinkers (see Table 4-1) are 6.75 times more likely to be Risky Partiers compared to Restrictive Non-Partiers, whereas those considered heavy episodic drinkers were another 6.75 times more likely to be Risky Partiers compared to Restrictive Non-Partiers. Interestingly, participants who drank were 7.87 times\(^5\) less likely to be Restrictive Partiers compared to Restrictive Non-Partiers. Participants who reported that they engaged in a hook-up on Friday night were

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\(^5\) In order to aid interpretation of the odds ratio, the inverse was calculated; 1/.127=7.87
5.95 times more likely to be Risky Partiers and 3.07 times more likely to be Restrictive Partiers rather than Restrictive Non-Partiers.

**Results for RQ 3**

RQ 3: How do students’ recreational networks change from Thursday to Friday night?

**Preliminary Model Identification**

As a preliminary step in LTA model selection to answer Research Question 3, a series of LCA models were fit to the data at Time 1 (Thursday night) and Time 2 (Friday night). A four-class LCA model was the best fit on Thursday, whereas a three-class LCA model was the best fit on Friday. This was informative about the latent structure within each time, and allowed the researcher to see how the structure changes across time points (Collins & Lanza, 2010). However, Collins and Lanza (2010) suggest that this should be viewed as a preliminary step, not as an absolute answer about the number of latent statuses in the latent transition model. It is possible that the best-fitting latent class model, in this case a four-class (Thursday night) or three-class (Friday night) LCA model, may not correspond to the best-fitting latent transition model, which is fit to all measurement occasions. This phenomena may be related to the additional information provided by multiple occasions of measurement (i.e., statistical power), which sometimes allows for the detection of additional latent statuses. Thus, as suggested by Collins and Lanza (2010), LCA was conducted as a preliminary step; however, the selection of the
LTA model was based primarily on the assessment of fit (described below) using the data from both time points.

Model Identification

Fit statistics were compared between models that contained two to five latent statuses (Table 4-6).

Table 4-6. Comparison of Latent Status Models

<table>
<thead>
<tr>
<th>Number of statuses</th>
<th>G²</th>
<th>AIC</th>
<th>BIC</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>862.59</td>
<td>892.59</td>
<td>953.72</td>
<td>4080</td>
</tr>
<tr>
<td>3</td>
<td>801.25</td>
<td>853.25</td>
<td>959.21</td>
<td>4069</td>
</tr>
<tr>
<td>4</td>
<td>721.67</td>
<td>799.67</td>
<td>958.61</td>
<td>4056</td>
</tr>
<tr>
<td>5</td>
<td>702.17</td>
<td>810.17</td>
<td>1030.24</td>
<td>4041</td>
</tr>
</tbody>
</table>

*Note. Boldface type indicates the selected model. AIC= Akaike’s Information Criterion; BIC= Bayesian Information Criterion; df= degrees of freedom*

Based on model interpretability, indices of fit (AIC and BIC), parsimony, and the likelihood $G^2$, the four-class model best fit the data. Specifically, the model with four statuses of recreation networks had the lowest AIC and BIC values and well-differentiated classes that captured meaningful differences in social network structures.

Table 4-7 presents the parameters for the four-class solution, where probabilities are given for the likelihood of code 2 for the indicators (shown in Table 3-2 within the Methodology Chapter). As previously mentioned in the Analytic Strategies section, PROC LCA/LTA produces maximum-likelihood estimates for parameters using the EM algorithm. Missing data on indicators is handled with the EM algorithm, which considers
data to be missing at random. This estimation procedure allows for missing data on all indicators (e.g. network items) but not on the covariates. Thus, item-response probabilities (Table 4-7) can be interpreted based on the full sample of 435 participants.

Table 4-7. Item-response probabilities 4-status LTA model (N=435)

<table>
<thead>
<tr>
<th>Proportion of status at:</th>
<th>Risky Partiers (RiskP)</th>
<th>Restrictive Partiers (RP)</th>
<th>Inclusive Non-Partiers (INP)</th>
<th>Restrictive Non-Partiers (RNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday Night (Time 1)</td>
<td>22.9%</td>
<td>28.3%</td>
<td>28.8%</td>
<td>19.9%</td>
</tr>
<tr>
<td>Friday Night (Time 2)</td>
<td>25.8%</td>
<td>44.8%</td>
<td>3.0%</td>
<td>26.3%</td>
</tr>
</tbody>
</table>

Item-Response Probabilities

| Larger network                         | .84                    | .01                       | .68                         | .01                           |
| Mixed-gendered network                  | .80                    | .24                       | .56                         | .06                           |
| Drinking buddy in network               | .67                    | .26                       | .03                         | .10                           |
| Not trusting network members            | .87                    | .47                       | .73                         | .38                           |
| Going to a party with network members   | .81                    | .64                       | .25                         | .18                           |
| Legal age of network members            | .83                    | .89                       | .42                         | .01                           |

Note: Item-response probabilities are constrained to be equal at two time points. Entries in bold font indicate status-defining probabilities (> .50).

**Latent Statuses of the Recreational Networks**

Table 4-7 presents the results of the four-status solution. Restrictive Non-Partiers were unlikely to endorse any of the code-2 recreational network characteristics on Thursday and Friday night. Inclusive Non-Partiers reported a larger (probability=.68),
mixed-gendered network (probability=.56) and not trusting network members (probability=.73). However, they were unlikely to report going to a party, going out with a drinking buddy, and having network members above the age of 21. In contrast, Restrictive Partiers were likely to report going to a party (probability=.64) and having network members above the age of 21 (probability=.89), yet they belonged to a smaller, same-gendered, and more trusting network without a drinking buddy. Risky Partiers were distinguished from the other statuses by elevated probabilities of endorsement of all recreational network indicators, including hanging out with drinking buddies (probability=.67).

**Changes in Recreational Networks**

The top section of Table 4-7 shows the proportion of students who belonged to each of the four latent statuses on Thursday and Friday night. On Thursday night, the Inclusive Non-Partiers were the most prevalent (28.8%), followed by Restrictive Partiers (28.3%), and Risky Partiers (22.9%). Restrictive Non-Partiers was the smallest recreational network on Thursday, representing only (19.9%) of students. On Friday night, Restrictive Partiers became the most prevalent recreational network, increasing their prevalence from 28.3% to 44.8%. Restrictive Non-Partiers also showed an increase in prevalence from 19.9% to 26.3%, and Risky Partiers showed a slight increase from 22.9% to 25.8%. Interestingly, Inclusive Non-Partiers showed the only decrease in prevalence, from having the largest prevalence on Thursday (28.8%) to the smallest prevalence on Friday (3.0%).
Displayed in Table 4-8 is the probability of membership in the latent status on Friday night, given latent status membership on Thursday night (i.e., transition probabilities).

<table>
<thead>
<tr>
<th>Transitions from Thursday (rows) to Friday (columns):</th>
<th>Risky Partiers</th>
<th>Restrictive Partiers</th>
<th>Inclusive Non-Partiers</th>
<th>Restrictive Non-Partiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risky Partiers</td>
<td>.36</td>
<td>.50</td>
<td>.00</td>
<td>.14</td>
</tr>
<tr>
<td>Restrictive Partiers</td>
<td>.10</td>
<td>.90</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Inclusive Non-Partiers</td>
<td>.51</td>
<td>.07</td>
<td>.11</td>
<td>.32</td>
</tr>
<tr>
<td>Restrictive Non-Partiers</td>
<td>.00</td>
<td>.29</td>
<td>.00</td>
<td>.71</td>
</tr>
</tbody>
</table>

Note: Entries in bold and italic font indicate membership in the same latent status at both times (i.e., stability).

Probabilities in bold and italic font on the diagonal of the matrix reflect the probability of membership in the same recreational network on both Thursday and Friday. Restrictive Partiers on Thursday were likely to remain in the same status on Friday, with 90% of those on Thursday most likely to remain in the same network the following night. Restrictive Non-Partiers were also more likely to remain in the same network the following night, with 71% remaining Restrictive Non-Partiers. Conversely, students who were Risky Partiers and Inclusive Non-Partiers were less likely to be in the same network on both evenings (36% and 11%). Inclusive Non-Partiers who changed recreational networks were most likely to endorse more risky network characteristics, transitioning to the Risky Partiers (51%), but were also likely to transition to Restrictive Non-Partiers (32%). Among Risky Partiers on Thursday, half (50%) remained in a partying network by transitioning to Restrictive Partiers. Not surprisingly, of the few Restrictive Partiers who did not remain in that status, they were likely to become Risky Partiers (10%).
whereas Restrictive Non-Partiers who changed networks from Thursday to Friday night were likely to become Restrictive Partiers (29%).

**Results for RQ 4**

RQ 4: How are college students’ drinking and hooking-up behavior associated with changes in students’ recreational networks from Thursday to Friday night?

**Drinking, Hooking-up, and Recreational Networks Over a Weekend**

Covariates were added to the LTA model to examine the effect of drinking and hooking-up on the transition probabilities from Thursday to Friday. The researcher estimated the effect of drinking and hooking-up on the likelihood of transitioning into a partying network (i.e., Risky Partiers) at Time 2 compared to any other status. The top panel of Table 4-9 shows these results.

As seen in Table 4-9, the fit of the LTA model was significantly improved with both covariates compared to the fit of the baseline model without covariates (LRT=852.14, df= 9, p=0.001). This indicated that the transition probabilities into the Risky Partiers status differed among the four statuses based on the whether they hooked-up or drank alcohol on Friday night. Additional models were conducted to determine which behavior contributed to this difference. First, the fit of the model (two main effects for drinking and hooking-up) was compared to the model with the main effect of drinking removed. This resulted in a significant difference (LRT=84.40, df= 3, p=0.001).
Secondly, the last model compared the fit of the model with the main effect of hooking-up removed. This finding was also significant (LRT=44.02, df=3, p=0.001) Therefore, each behavior (i.e., drinking and hooking-up) was associated with transition to or remaining in the Risky Partiers, compared to all other recreational network statuses.
Table 4-9. Comparison of Models with Risky Partiers as the reference group probabilities for 4-status LTA model (n=286)

<table>
<thead>
<tr>
<th>Recreational Networks</th>
<th>Model</th>
<th>LogLike</th>
<th>LRT</th>
<th>df</th>
<th>p-value</th>
<th>B</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (All Recreational Networks)</td>
<td>All terms</td>
<td>1641.33</td>
<td>852.14*</td>
<td>9</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drink removed</td>
<td>1683.53</td>
<td>84.40*</td>
<td>3</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hook-up removed</td>
<td>1663.34</td>
<td>44.02*</td>
<td>3</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrictive Partiers</td>
<td>All terms</td>
<td>1664.42</td>
<td>805.96*</td>
<td>3</td>
<td>.001</td>
<td>-2.32</td>
<td>6.49</td>
</tr>
<tr>
<td></td>
<td>Drink Removed</td>
<td>1687.43</td>
<td>46.02*</td>
<td>1</td>
<td>.001</td>
<td>-2.32</td>
<td>6.49</td>
</tr>
<tr>
<td></td>
<td>Hook-up Removed</td>
<td>1689.55</td>
<td>50.26*</td>
<td>1</td>
<td>.001</td>
<td>1.87</td>
<td>.10</td>
</tr>
<tr>
<td>Inclusive Non-Partiers</td>
<td>All terms</td>
<td>1645.41</td>
<td>843.92*</td>
<td>3</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drink Removed</td>
<td>1684.49</td>
<td>78.16*</td>
<td>1</td>
<td>.001</td>
<td>2.11</td>
<td>8.27</td>
</tr>
<tr>
<td></td>
<td>Hook-up Removed</td>
<td>1666.88</td>
<td>42.94*</td>
<td>1</td>
<td>.001</td>
<td>.25</td>
<td>1.28</td>
</tr>
<tr>
<td>Risky Partiers</td>
<td>All terms</td>
<td>1667.89</td>
<td>798.96*</td>
<td>3</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drink Removed</td>
<td>1679.15</td>
<td>22.52*</td>
<td>1</td>
<td>.001</td>
<td>.569</td>
<td>1.77</td>
</tr>
<tr>
<td></td>
<td>Hook-up Removed</td>
<td>1692.18</td>
<td>48.58*</td>
<td>1</td>
<td>.001</td>
<td>-.36</td>
<td>.69</td>
</tr>
</tbody>
</table>

*p<.05
Next, the researcher replicated the steps for the two regression models separately for three of the Thursday recreational networks, in order to determine if Thursday-night recreational network status moderated the effects of drinking and hooking-up on individuals transitioning to the Risky Partiers status. The Restrictive Non-Partiers’ status was not estimated because there was a zero transition probability from Restrictive Non-Partiers to Risky Partiers across the two time points (see the last section of Table 4-8).

In the lower section of Table 4-9, the results of the models predicting membership in the Risky Partiers group separately by each Thursday-night recreational network status are presented. Models that tested the significance of each covariate were estimated within each recreational network. Among Thursday Restrictive Partiers, the model with both covariates resulted in significant model improvement (LRT=805.96, df=3, p=0.001). Following models revealed that this effect was due to both drinking (LRT=46.02, df=1, p=0.001) and hooking-up (LRT=50.26, df=1, p=0.001). The beta coefficient and OR associated with each of the covariates are shown in the last columns of Table 4-9. These results indicated that among Restrictive Partiers, drinking (OR=6.49) was related to a significant increase in odds of transitioning to Risky Partiers, and hooking-up (OR=0.10) was significantly related to decreased odds of transitioning to Risky Partiers, compared to all other recreational networks. Thus, drinking was associated with Restrictive Partiers being roughly 6 times more likely to become Risky Partiers on Friday night, whereas hooking-up was associated with being 10 times (1/OR=1/0.10=10) less likely to transition to Risky Partiers, compared to any other status on Friday night.

Among Thursday Inclusive Non-Partiers, the model with both covariates also resulted in significant model improvement (LRT=843.92, df=3, p=0.001). Subsequent
analyses revealed this effect was due to both drinking ($LRT=78.16, df=1, p=0.001$) and hooking-up ($LRT=42.94, df=1, p=0.001$). These results indicated that among Inclusive Non-Partiers, both drinking (OR=8.27) and hooking-up (OR=1.28) were related to a significant increase in the odds of transitioning to Risky Partiers, compared to all other recreational networks. In other words, drinking was associated with Inclusive Non-Partiers being roughly 8 times more likely to become Risky Partiers on Friday night, and hooking-up was associated with being 1.28 times more likely to transition to Risky Partiers, compared to any other status on Friday night.

The significance test of the covariates on membership in the Risky Partiers on Friday was also significant among those students who were Risky Partiers on Thursday ($LRT=898.96, df=3, p=0.001$). Further analyses showed that drinking led to increased odds (OR=1.77) of staying a Risky Partier, whereas hooking-up (OR=.69) led to decreased odds remaining a Risky Partier. These results indicated that for Thursday-night Risky Partiers, the odds of staying a Risky Partier on Friday night are 1.77 times higher than transiting to any other recreational network. In comparison, hooking-up was associated with Thursday Risky Partiers being 1.45 times less likely to remain a Risky Partier on Friday night, relative to transition to any other recreational network.

**Summary**

In this chapter, analyses were performed, and the results of each analysis were presented for the four research questions addressed in this study. A summary of the study
and discussion of the results within the wider literature are presented Chapter 5, along with practical implications.
Chapter 5

Summary, Conclusions, and Recommendations

The purpose of this study was to use repeated measures data from The Recreational Activities of College Students in order to identify and capture the temporal complexities of network characteristics as they relate to drinking alcohol and hooking-up among a sample of college students over the period of a weekend. The portion of the HUDSoN Questionnaire that was analyzed for this study concerned aspects of students’ recreational networks including: size of network, network gender diversity, drinking buddy in network, activities engaged in by each network member, trust in network members, and age of network members. Further, questions about alcohol consumption and hooking-up behavior were included in the data analyses.

The specific aims and research questions examined were as follows:

Aim 1. Examine the heterogeneity in network characteristics associated with drinking and hooking-up.

RQ 1: What network profiles (latent class structures) represent the variation in recreational networks among college students on a weekend night?

RQ 2: Are college students’ drinking and hooking-up behaviors associated with particular recreational networks?

Aim 2. Explore the temporal changes in network characteristics associated with drinking and/or high risk sexual behavior that occur over a weekend.
RQ 3: How do students’ recreational networks change from Thursday to Friday night?

RQ 4: How are college students’ drinking and hooking-up behaviors associated with changes in the students’ recreational networks?

The study analyzed data collected from 435 college students over the course of a weekend in either the spring, summer, or fall semesters of 2012. Students were recruited from two types of general education courses (i.e., communication and health) and completed an online survey. After analyzing the collected data, several interesting findings emerged, which are discussed in the following section.

Summary of Findings and Discussion

The research questions in this study were derived from four main bodies of literature focusing on college students in the U.S.: 1) Social networks, 2) Alcohol use, 3) Hooking-up, and 4) Unwanted sexual experiences. The following is a summary of the findings for each of the aims and discussion related to each of the research questions explored in this study.

Summary of Findings for Aim 1

In this study, the use of latent class analysis resulted in a meaningful identification of weekend recreational networks that undergraduate students developed in college on Friday nights. In regard to the first aim, this study identified three key subgroups of
Friday night recreational networks: 1) Risky Partiers, 2) Restrictive Partiers, and 3) Restrictive Non-Partiers. Each of these subgroups is distinguished on the basis of different combinations of network size, gender of network members, drinking buddies in the network, activities engaged in with network members, trust of network members, and age of network members. In addition, self-reported drinking behavior and whether students engaged in a hook-up were associated with the type of recreational network to which students belonged. These analyses provide important insights into the types of weekend recreational networks that students develop in college and help researchers to better understand characteristics of the networks that may make students vulnerable to potentially risky behaviors (e.g., drinking and hooking-up).

Discussion of RQ 1

RQ 1: What network profiles (latent class structures) represent the variation in recreational networks among college students on a weekend night?

Types of Recreational Networks

Three Friday-night recreational networks were identified: 1) Risky Partiers, 2) Restrictive Partiers, and 3) Restrictive Non-Partiers. Overall, these findings suggest that college youth develop distinct weekend recreational networks that may or may not place the student at risk for drinking and hooking-up. The Risky Partiers and the Restrictive Partiers both seem to be vulnerable recreational networks that support a social
environment for drinking. These findings are supported by previous research that shows that some students are in social environments on the weekend that encourage drinking. For example, Maggs and colleagues (2011) found that students were more likely to drink on the weekend compared to the weekday and that weekend drinking was more likely to involve peers. While weekday versus weekend recreational networks were not directly compared by the current study, the current findings are supported by Maggs and colleagues’ (2011) previous work, which suggests students’ weekend peer groups may place them at risk for drinking. Moreover, Finlay and colleagues (2012) found that among college students, those who engaged in sociable casual leisure activities on the weekend, like attending a party, were more likely to consume alcohol, whereas Green (2005) and Karshin (2001) both demonstrated that students tend to drink with friends during the weekend in large social settings like parties and bars.

On Friday night, the Risky Partiers endorsed the most risky network characteristics for drinking and hooking-up. Risky Partiers were more likely to go to parties in a larger, mixed-gendered network with at least one drinking buddy. This finding is similar to the work done by Rosenbluth and colleagues (1978) in a classic study where they found that larger drinking groups in college were associated with greater alcohol consumption. Furthermore, the risky network characteristics endorsed by the Risky Partiers have all been shown in previous research to increase risky alcohol use (Delucchi et al., 2008; Homish & Leonard, 2008; Lau-Barraco & Collins, 2011; Leonard et al., 2000; McCabe et al., 2006; Park et al., 2009; Reifman et al., 2006). For instance, research done by Delucchi and colleagues (2008) found that a larger social network of binge drinkers was associated with greater levels of drinking. Additionally, work by both
Homish and Leonard (2008) and Leonard and colleagues (2000) showed that networks containing drinking buddies increased the likelihood of alcohol consumption for participants. The findings from these previous studies, as well as the findings of the current study, suggest that it is important to consider the size of a network, in conjunction with peer alcohol use within the network, for alcohol use among young adults.

These Risky Partiers, Restrictive Non-Partiers, and Restrictive Partiers may also represent a developmental aspect of weekend recreational networks for college students. For instance, these results also showed that Risky Partiers and Restrictive Partiers hung out with older people. Since Restrictive Non-Partiers were not hanging-out with older students, they may be younger students who have not been on campus long enough to have access to a larger, older network that goes to parties. As time progresses, Restrictive Non-Partiers may then begin to develop their partying networks as they interact with more students who are older and have knowledge and access to parties.

While previous research has not examined how students’ recreational networks change throughout the college years, some previous research shows that students’ friendship groups do change over time (Burger & Koch, 2011; Hays & Oxley, 1986; Klausner, 2009). For instance, Klausner (2009) found that it takes about two years for students to begin to solidify their friendship groups. Therefore, it may take up to two years for students to gain access to the types of recreational networks where partying behavior is more common and consistently available. This finding is also supported by a qualitative study conducted by Burger and Koch (2011), which suggests that hanging out with older students who are legally able to drink may increase accessibility to alcohol and normalize partying and drinking behavior. Thus, previous research supports the idea that there is a
developmental aspect to students’ recreational networks; however, how this developmental aspect relates to students’ risk of alcohol use and hooking-up still warrants further research.

Both Partier networks also reported some distrust of their recreation-network members. This finding has not been demonstrated by past research and is concerning, as it suggests that students are going to parties with people they cannot rely upon if negative consequences occur, such as injury, unwanted sex, or alcohol overdose. Thus, the current study highlights the important role that the development of trusting friendships plays in students’ health and safety.

Discussion of RQ 2

RQ 2: Are college students’ drinking and hooking-up behaviors associated with particular recreational networks?

Drinking and Recreational Networks

The findings indicate that students who consumed alcohol were more likely to be Risky Partiers and less likely to be Restrictive Partiers compared to the Restrictive Non-Partiers. While Risky Partiers were in the social environment associated with risky alcohol use (i.e., large, older, mixed-gendered networks that contain a drinking buddy and involve going to parities) and were more likely to drink, interestingly, students who were Restrictive Partiers, whose group shared some network characteristics with Risky
Partiers, were less likely to drink (Delucchi, 2008; Green, 2005; Homish and Leonard, 2008; Karshin, 2001, Lau-Barraco and Collins, 2011; Leonard et al., 2000; McCabe et al., 2005; Park et al., 2009; Reifman et al., 2006). These results were somewhat surprising, as Restrictive Partiers also endorsed some of the risky network characteristics like going out to a party with people above the age of 21.

The Restrictive Partiers group was the only recreational network in which students were less likely to be drinking despite attending a party. Restrictive Partiers could be having a “girls’ night” or a “guys’ night” out and not be interested in being at the center of the party, drinking and mingling with strangers. Therefore, drinking in a small and same-gendered group without any drinking buddies may mitigate the social influence to engage in riskier drinking behavior that takes place at a larger, mixed-gendered party (Delucchi, 2008; Green, 2005; Homish and Leonard, 2008; Karshin, 2001, Lau-Barraco and Collins, 2011; Leonard et al., 2000; McCabe et al., 2005; Park et al., 2009; Reifman et al., 2006). This result is somewhat supported by Senchak and colleagues (1998), who found that gender make-up and size the network contributes to the level of drunkenness. Senchak and colleagues (1998) found that men reported greater frequency of drunkenness in large, mixed-gendered groups and small, same-gendered groups, whereas women’s drinking frequency was unrelated to gender mix or group size. While the current study did not examine gender differences pertaining to recreational networks, the current study and previous work by Senchak and colleagues (1998) suggests that certain network characteristics (e.g., size and gender make-up) may mitigate drinking based on the context or situation. Thus, drinking could be minimized at social
environments like parties depending on the characteristics of the recreational network, such as size and gender mix; this finding warrants further study.

*Hooking-up and Recreational Networks*

The results also showed that students who hooked-up on Friday night were more likely to be Risky Partiers and Restrictive Partiers compared to the Restrictive Non-Partiers. Consistent with prior research, students were more likely to hook-up in recreational networks in which parties were attended (Paul & Hayes, 2002). In the qualitative study conducted by Paul and Hays (2002), one female student expressed that hooking-up often takes place at a party where alcohol is available. She stated, “From my experience hook-ups always happen at parties with alcohol and drugs. Many of these situations involve alcohol and drugs because people lose inhibition and wear beer goggles, increasing the chances of a hook-up” (p. 646). Interestingly, the current findings showed that hooking-up occurred in two different types of partying networks: those of Risky Partiers, who were also more likely to be drinking, and Restrictive Partiers, who were less likely to be drinking. Hooking-up in these two types of partying networks demonstrates that this behavior takes place in two different partying contexts with differing levels of alcohol consumption. This suggests that there may be “risky” and “safe” hook-ups and that further exploration is needed.


**Risky Hook-ups and Safe Hook-ups**

Hooking-up in certain recreational networks may place students at an increased risk of having unwanted sexual experiences. For instance, Risky Partiers were more likely to be both drinking and hooking-up, whereas Restrictive Partiers were more likely to hook-up but less likely to be drinking. Hooking-up as a Risky Partier may involve the type of recreational network in which unwanted sexual experiences are more likely to occur due to the co-occurrence of drinking and hooking-up.

The co-occurrence of alcohol use and hooking-up has been examined in previous research (Desiderato & Crawford, 1995; Green, 2005; Fielder & Carey, 2010), especially as risk factors for unwanted sexual experiences. For instance, research has shown that both drinking and hooking-up place students at risk for sexual assault (Abbey et al., 1996; Testa et al., 2010). More specifically, Flack and colleagues (2007) found that one-third of female college students experience some form of unwanted sex, usually under the influence of alcohol, and, of this group, 78% of these encounters took place during a hook-up.

While the relationship between alcohol use, hooking-up, and unwanted sex has been previously studied, the social context (i.e., recreational network) in which these phenomena interact has not been previously explored. Hooking-up as a Risky Partier, where drinking is highly likely, could place students at an increased risk of having unwanted sex and would therefore be considered a risky hook-up. In contrast, hooking-up as a Restrictive Partier may not place the student at an increased risk of having unwanted sex since drinking would be minimal; thus hooking-up in this type of
recreational network would be considered safer. This finding suggests that hooking-up is taking place in different social contexts that may place students at differing risk for unwanted sexual experiences, thus indicating that there may be risky hook-ups and safe hook-ups depending on the recreational network in which students are embedded.

Past research has also shown that the majority of research on hooking-up focuses on its relationship to alcohol use (Desiderato & Crawford, 1995; Green, 2005, Fielder & Carey, 2010 Flack et al., 2007, Lambert et al., 2003, Lewis, Granato, Blayney, Lostutter, & Kilmer, 2012; Paul & Hays, 2002). Karshin (2001), Lambert and colleagues (2003), and Paul and Hays (2002) all found that alcohol use was used to facilitate a hook-up experience. More specifically, Lewis and colleagues (2012) found within their college sample that alcohol use was involved in the majority of hook-ups. This previous research supports the current study’s finding that students who hook-up were more likely to be Risky Partiers, where alcohol use was more likely. However, the finding that Restrictive Partiers were also more likely to hook-up but less likely to drink compared to the Restrictive Non-Partiers was not supported by previous research. This could be due to the dearth of research on hooking-up in recreational networks.

Past hooking-up research has also demonstrated that hooking-up usually takes place between friends and acquaintances rather than newly introduced random strangers (Bogle, 2008; Paul & Hays, 2002; Paul et al., 2000; Stinson, 2010). Bogle (2008) found that students are more likely to hook-up with friends, classmates, or other students with whom they are familiar. This finding is also supported by Paul and colleagues (2000), who found that some students used their friendship groups as a means to hook-up. More specifically, networking among friends often resulted in a hook-up, where friends fixed
their friends up with suitable sexual partners. The current finding that Restrictive Partiers were more likely to hook-up is supported by this past research. While Restrictive Partiers were more likely to go out in a same-gendered network, 37% of Restrictive Partiers did have a mixed-gendered network (probability .37). Since Restrictive Partiers were in smaller, more cohesive networks with friends or acquaintances, this suggests that some Restrictive Partiers may be hooking-up with partners with whom they feel a sense of familiarity and security. Hooking-up in as Restrictive Partiers may reduce the risk for unwanted sex since students were more likely to hook-up in a smaller cohesive network and less likely to be drinking.

Surprisingly, students in both partier networks reported some level of distrust of their recreational network members. This finding is concerning, as it suggests that students may be hooking-up with network members they do not completely trust. Thus, for any particular night, if students are surrounded by peers whom they do not trust, and they are hooking-up with these peers, it is unlikely that these students would have others within that recreational network they can rely upon if a sexual assault were to occur. While the associations among trust, peers, and unwanted sex have not been studied in previous research, Abbey (2002) acknowledged the multi-dimensional role that trust plays in interactions between men and women. More specifically, Abbey (2002) states, “…women also realize that sexual assault is common and they must be on the alert to be assured that they can trust the man with whom they are interacting,” and “On a date or with friends at a party or bar, women (and men) typically assume they can trust their companions. Being intoxicated allows women to let down their guard and focus on their desire to have fun and be liked rather than on their personal safety” (p.123).
Summary of Findings for Aim 2

This current study used person-centered analyses to explore a multidimensional model of recreational networks among a sample of college students. The LTA model was estimated, which showed that college students transition between four different types of recreational networks from Thursday to Friday: 1) Risky Partiers, 2) Restrictive Partiers, 3) Inclusive Non Partiers, and 4) Restrictive Non Partiers. These four recreation-network statuses differ on the basis of network size, gender of network members, drinking buddies in the network, activities engaged in with network members, trust of network members, and age of network members. In addition, self-reported drinking behavior and engagement in a hook-up provided reasons as to why students may transition from one recreational network to another. Thus, this study provides unique insights into the dynamic nature of students’ recreational networks.

Discussion of RQ 3

RQ 3: How do students’ recreational networks change from Thursday to Friday night?

Variability of Recreational Networks

The current study extended previous research exploring college students and their networks in several ways. First, by including indicators with temporal variability of Thursday’s and Friday’s social environment in the LTA model of recreational networks,
the researcher was able to identify latent subgroups of networks based on whom students were hanging out with on a particular night. The results showed that undergraduate students developed four subgroups of recreational network statuses, three of which are similar to the subgroups identified by the LCA conducted on Friday night’s data. The four recreational network statuses are Risky Partiers, Restrictive Partiers, Inclusive Non-Partiers, and Restrictive Non-Partiers. Similar to the LCA results that addressed RQ 1, these statuses developed by the students on Thursday and Friday nights are distinguished from one another by their endorsement of risky network characteristics for drinking and hooking-up. Two of these recreational networks were partier networks, while the other two networks consisted of students who engaged in non-partying activities. The Risky Partiers, Restrictive Partiers, and Restrictive Non-Partiers all endorsed characteristics similar to the previous three classes found through the LCA that addressed the first two research questions. For instance, as previously discussed, the Risky Partiers showed elevated probabilities of going to a party with a larger, mixed-gendered network and having a drinking buddy in their network, which could indicate a higher risk of drinking (Delucchi et al., 2008; Homish & Leonard, 2008; Lau-Barraco & Collins, 2011; Leonard et al., 2000; McCabe et al., 2006; Park et al., 2009; Reifman et al., 2006). The Restrictive Partiers only endorsed some characteristics that may place students at risk for drinking, like going to a party with people above the age of 21 (Burger & Koch, 2011), whereas Restrictive Non-Partiers did not endorse any network characteristics that place them at risk for alcohol use and hooking-up. As a result of the LTA model, a new recreational

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6 The discrepancy between the 3-class LCA model and the 4-class LTA model is addressed in the following section of the discussion.
network emerged, the Inclusive Non-Partiers. While the Inclusive Non-Partiers endorsed hanging out in a larger mixed-gendered group, which may place students at risk for drinking (Delucchi et al., 2008; Rosenbluth et al., 1978), these students were also unlikely to attend parties with network members and interact with drinking buddies. Thus, these results add to the literature by emphasizing the variability in recreational networks that students develop on Thursday and Friday nights and which may or may not place them at risk for drinking and hooking-up.

*Three Recreational Network Classes vs. Four Recreational Network Statuses*

The three-class LCA model and the four-class LTA model were very similar. In the LTA model, students in three of the four subgroups (Risky Partiers, Restrictive Partiers, and Restrictive Non-Partiers) endorsed network characteristics similar to those of the three-class LCA model, which addressed the first and second research questions. However, one new recreational network, the Inclusive Non-Partiers, emerged as a result of the LTA model. This type of discrepancy can occur in LCA/LTA analyses. According to Collins and Lanza (2010), the best-fitting model based on the data from multiple time points may include a different number of latent statuses than the number of latent classes identified at one particular time point. This can occur for two reasons. One reason is related to statistical power, in which the additional information provided by including multiple time points in the model enables the detection of additional latent classes. Another reason is that LCA performed on a singular time point may not identify some latent statuses that occur on other occasions, particularly if the measured
phenomena change across time. More specifically, in LTA, some latent statuses may have a low prevalence at one time point and an increased prevalence at a subsequent time point, or vice versa.

In regard to the current research, the prevalence rate for Inclusive Non-Partiers changed drastically across the two nights. Inclusive Non-Partiers comprised 28.8% of the sample on Thursday night and only 3% of the sample on Friday night. Therefore, the LCA conducted on Friday night’s data would not have been able to identify the Inclusive Non-Partier class due to the low prevalence rate exhibited on Friday night.

**Stability of Recreational Networks**

This study is the first to apply LTA to changes in recreational networks that occur on a daily basis, from Thursday to Friday night. Using LTA with network measures repeated on Thursday and Friday, the results suggested that roughly 70% of students transitioned into a Partier network, whether they became a Risky Partier or a Restrictive Partier. In particular, the Risky Partiers and Risky Non-Partiers displayed the least stability across the two nights, both moving to a Partier network. Risky Partiers were most likely to become Restrictive Partiers, whereas Risky Non-Partiers were more likely to become Risky Partiers. While some students’ recreational networks were extremely dynamic from Thursday to Friday night, surprisingly, Restrictive Partiers were quite stable. Students who were Restrictive Partiers on Thursday tended to stay Restrictive Partiers on Friday. Overall, these results emphasize that students’ networks, particularly
their recreational networks, are dynamic, which in turn may be associated with varying levels of risk to hook-up and drink, depending on the network.

Examining how students transition from potentially risky recreational networks on Thursday to Friday nights extends upon research that examines drinking patterns across the college student weekend (i.e., Thursday, Friday, and Saturday). Students who were partiers on Thursday were more likely to stay partiers on Friday. Previous studies have shown that students who drink on Thursday nights tend to drink more across the whole weekend, are more likely to be moderate or heavy drinkers, and experience a greater number of negative consequences (Cleveland et al., 2012; Hoeppner, Barnett, Jackson, Colby, Kahler, Monti, … & Fingeret, 2012; Ward, Cleveland, & Messman-Moore, 2013). Hoeppner and colleagues (2012) found that first-year students who engaged in Thursday drinking reported an increase in Friday and Saturday drinking and an overall higher percentage of drinking days over the course of their first year. Cleveland and colleagues (2012) found similar results, with heavy drinkers having a strong likelihood of Thursday drinking as well as elevated levels of drinking during the rest of the week (Sunday through Wednesday). Therefore, Thursday night’s behavior is important to consider for evaluating the level of drinking risk for the rest of the weekend. Thus, the current findings extend upon previous research that has examined drinking patterns. The findings show how students transition between their recreational networks, which yields further insight into the social context in which Thursday- and Friday-night drinking and hooking-up occur.
Discussion of RQ 4

RQ 4: How are college students’ drinking and hooking-up behavior associated with changes in the students’ recreational networks?

Drinking and Hooking-up Effects on Transitioning

Results showed that students develop distinct recreational networks based on the endorsement of risky network characteristics and that drinking and hooking-up are associated with students’ transition into a risky recreational network. Prior studies have only examined a few aspects of students’ social networks associated with drinking (Delucchi et al., 2008; Homish & Leonard, 2008; Lau-Barraco & Collins, 2011; Rosenbluth et al., 1978; Senchak et al., 1998) or hooking-up (Cooper et al., 1998; Paul & Hays, 2002; Paul et al., 2000; Stinson, 2010). To our knowledge, no other studies have explored the roles that drinking and hooking-up play in specific types of recreational networks throughout the weekend. As previously discussed, Rosenbluth et al. (1978) found that larger drinking groups in college were associated with greater consumption of alcohol, while more recently Senchak and colleagues (1998) found that college men reported greater frequency of drunkenness in large groups of mixed-sex and small groups of same-sex compared to small mixed-sex groups. In contrast, women’s frequency of drunkenness was unrelated to gender mix or group size. Research by Wood and colleagues (2007) also supports the current research. They found that drinking varies considerably across the weekend (Wood, Sher, & Rutledge, 2007); whereas the current findings show that the social context in which those students are drinking varies as well.
Therefore, students’ variability in their drinking patterns may be related to the variability in their recreational networks. In regard to hooking-up and networks, Cooper and colleagues (1998) found that students may hook-up for two reasons: 1) they feel pressured by their network and do not want their friends to think less of them, and 2) they want to make an intimate connection with another person. Thus, based upon current findings and previous findings by Cooper and colleagues (1998), students hook-up for very different reasons, which may depend on the recreational network they embed themselves in from one day to the next.

Whether students transitioned into a risky network may also depend on what type of network they are in on Thursday night. Results showed that Risky Partiers on Thursday who drank on Friday were likely to stay Risky Partiers on Friday, whereas Restrictive Partiers and Inclusive Non-Partiers on Thursday who drank on Friday were likely to become Risky Partiers on Friday. Yet, students who were Restrictive Non-Partiers on Thursday did not transition to become Risky Partiers on Friday. Students who are in partying networks may be more likely to stay within these partying networks on subsequent nights. These results also give further support to the concept that students embed themselves in different types of networks depending on their drinking patterns. For instance, the Inclusive Non-Partiers may be students who do not party and drink on Thursday night but are partiers and drinkers on Friday night. These results complement research by Cleveland and colleagues (2012), who identified four types of drinkers using LTA: 1) nondrinkers, 2) weekend nonbingers, 3) weekend bingers, and 4) heavy drinkers. Heavy drinkers were the only students who endorsed drinking on Thursday. Thus, in conjunction with the current findings, students who are Inclusive Non-Partiers on Fridays
may have similar drinking patterns to those students who are weekend non-bingers and weekend bingers, since these students were not in a partying network on Thursday. Further, students who are Risky Partiers may have similar drinking patterns to those students who are heavy drinkers, since these students were in a partying network on Thursday. This should be studied in further research.

Surprisingly, results showed that hooking-up on Friday was associated with a decrease in likelihood of transitioning to Risky Partiers from Thursday to Friday except for the Inclusive Non-Partiers. Inclusive Non-Partiers were the only students where drinking and hooking-up both increased the odds of becoming Risky Partiers on Friday. Past research has demonstrated a link between drinking and hooking-up (Desiderato & Crawford, 1995; Fielder & Carey, 2010; Green, 2005); however, there is a lack of literature examining the types of social contexts in which students hook-up. While most students hook-up under the influence of alcohol (Desiderato & Crawford, 1995; Fielder & Carey, 2010; Green, 2005), there are still some students who hook-up sober. Thus, students (Risky Partiers and Restrictive Partiers) who party and drink one night may be using the partying social environment as a way to find someone to hook-up with the following night in a non-partying environment. This lack of congruency on the effect of drinking and hooking-up on transitioning to a risky recreational network suggests that students choose to interact with a different recreational network depending on whether they want hooking-up in a non-drinking context.
Conceptual Model

Based on the results of the current study, a conceptual model using multiple theoretical approaches has been created to examine how the findings inform the broader relationship between social networks, alcohol use, and hooking-up. These theoretical approaches include the Theory of Planned Behavior, as previously described in the Methods section, as well as Homophily and Contagion theories.

Alcohol use and hooking-up behavior can be viewed from a network perspective. In the field of social networks, two competing yet complementary types of theories exist. The first type is Homophily theories, which state that ties are created between nodes based on similarity. Put another way, Homophily is the selection of others who are similar (Monge & Contractor, 2003). Past research has explored Homophily in terms of age, gender, education, prestige, social class, tenure, and occupation (Monge & Contractor, 2003). For example, an individual is more likely to choose to be friends with someone who is of the same gender, age, education level, and social class. Homophily theories can be extended to behaviors and attitudes; an individual is more likely to choose to be friends with someone who engages in the same behaviors and has similar attitudes.

The other type of theory about social networks is Contagion theories, which state that as people are exposed to others in the network, there is an increased likelihood that their beliefs, assumptions, and attitudes will become similar to others within the network (Monge & Contractor, 2003). Therefore, individuals within a network do not need to be similar in these characteristics initially but will become increasingly similar to each other in these areas over time.
Homophily and Contagion theories are used to explain how ideas are adapted and spread throughout a network. Based on the results, the researcher proposes that the Homophily and Contagion theories both play a role in the adaption and spread of drinking and hooking-up. Homophily and Contagion theories, in combination with the Theory of Planned Behavior, operate to form a feedback loop (See Figure 5-1). For example, a person may have intentions to drink; therefore, he or she chooses a specific recreational network to facilitate that drinking, becoming part of a network that has similar intentions (Homophily). However, once that individual is embedded within that particular recreational network, he or she becomes influenced by the type of drinking that takes place (Contagion). If people in the recreational network are playing a drinking game, this individual would play the drinking game and imitate network members’ drinking behavior. In other words, he or she adapts drinking behaviors so they are similar to those of the network. Therefore, his or her drinking behavior, drinking norms, and attitudes towards drinking are reinforced by the recreational network in which he or she chooses to embed him or herself.
The findings from the current study seem to support both Homophily and Contagion theories, since students’ drinking and hooking-up behaviors are supported by the type of network in which they are embedded. However, further research using a longitudinal study design would need to be employed to be able to examine the extent to which each of the types of theories functions. Recommendations for future research in regard to the conceptual model are made in a subsequent section.

**Limitations**

While this study illuminates the different types of recreational networks that college students develop in regard to alcohol use and hooking-up, there are several limitations to be considered. First, there are a few limitations related to sampling. For
instance, the sample was not random and was relatively small due to a lack of monetary incentives. This resulted in a fairly homogenous group of undergraduate students from a single public, mid-Atlantic university. While the sample is representative of the sampled university population in regard to race, ethnicity, and age, generalization of the findings to samples in other geographic areas and other types of higher education institutions may be unwarranted. Second, the analyses were not truly longitudinal due to the design of the study; rather, the design consisted of repeated measures. While some of the analyses used LTA, the researcher was only able to examine the effects of transitioning from one type of network to another within a 24-hour period. The examination of potential longer longitudinal effects could show how students transition from one type of recreational network to another throughout college and may yield interesting developmental results. Third, the current study only used six network indicators from the HUDSoN. Using different network indicators for latent class analyses and latent transition analyses could yield very different results in terms of the types of network classes students form on the weekend. Another limitation is the timing of the assessment. Students completed the survey during a weekend either in the spring, summer, or fall. While there were no differences found among the students in regard to the variables assessed in the current study, students’ drinking and hooking-up behavior could vary dramatically from weekend to weekend. Furthermore, the current study only explored changes in students’ recreational networks from Thursday to Friday night. While this provides evidence that students’ networks change from Thursday to Friday, it does not show how students’ networks change from Friday to Saturday night or how their networks change throughout the semester. Additionally, demographics of the students, such as gender, age, and
Greek/Athletic status were not included in the analyses. Including these variables in the analyses could show that certain demographic characteristics place students into risky networks. Finally, while 435 students accessed the survey throughout the weekend, there were numerous questions that were skipped or not answered in the HUDSoN, resulting in data from only 286 participants being analyzed for the second and fourth research questions. This limited data was due to lack of monetary incentives, which would have been desirable in order to maintain a high response rate.

**Implications for Intervention**

The current study provides researchers with evidence that students’ networks could be targeted in prevention programs for alcohol use and risky sexual behavior in college. These interventions could take place before the student starts college, during students’ first year, or with students throughout the college years. Intervening at the network level may help to minimize the amount of drinking that students engage in and protect students against unwanted sex.

Several interventions targeting students’ alcohol use are implemented before students come to college (Turrisi, Jaccard, Taki, Dunnam, & Grimes, 2001). Turrisi and colleagues (2001) implemented a parent-based intervention through which parents were taught how to communicate with their children in order to reduce drinking. The intervention took place before students arrived on campus. During the transition period from high school to college, parents could be taught not only how to communicate to their children about drinking (Turrisi et al., 2001) but also how to communicate with their
children about making friends and building social networks in their new university environment. Based on the network variables used in the current analyses, the conversations between parents and their children could address each of these network indicators, encouraging their children to build networks similar to the Restrictive Partiers and Restrictive Non-Partiers. For instance, parents could be taught how to talk to their children about building trust among network members and teach their children how to go out in smaller groups.

Another type of common intervention targeting alcohol use usually takes place during students’ first year (Larimer et al., 2001; Marlatt, Baer, Kivlahan, Dimeff, Larimer, Quigley,…& Williams, 1998). For example, at the mid-Atlantic university where the study was conducted, first-year students are required to complete several online modules that are designed to teach students about alcohol and its effects on the body (Student Affairs EDGE, featuring PSU SAFE and PSU AWARE). Thus, first-year seminars could include teaching students not only how to reduce drinking but also how to avoid embedding themselves in risky networks and to maintain recreational networks similar to those of Restrictive Partiers and Restrictive Non-Partiers.

Some interventions targeting alcohol use take place throughout the college years (Borsari & Carey, 2001; Lewis & Neighbors, 2006; Neighbors, Larimer, & Lewis, 2004; Riper, van Straten, Keuken, Smit, Schippers, & Cuijpers, 2009; Walters & Neighbors, 2005). Many of these interventions have focused on various aspects of the peer group (Borsari & Carey, 2001). For instance, most Personalized Feedback Interventions (PFIs) provide students with information on perceived descriptive peer norms and actual descriptive peer norms (Lewis & Neighbors, 2006; Neighbors, Larimer, & Lewis, 2004;
Riper, van Straten, Keuken, Smit, Schippers, & Cuijpers, 2009; Walters & Neighbors, 2005). While these types of interventions include components examining peer norms, this feedback has not been tailored to the norms from the networks in which the particular student is embedded. For example, information on the student’s network could be collected to determine in what class of recreational network the student is usually embedded (i.e., Risky Partiers, Restrictive Partiers, Restrictive Non-Partiers, and Inclusive Non-Partiers). The network information could then be included as part of the personalized feedback, either online or face-to-face. Based upon the network information, personalized feedback could focus on teaching students who are already in risky networks how to avoid embedding themselves in these types of networks in the future. More specifically, they could be taught how to reduce the number of drinking buddies in a network, increase the level of trust between network members, and encourage students to go out in smaller groups. If the student is in a Restrictive Partier or Restrictive Non-Partier network, the personalized feedback could focus on how the student could maintain these types of networks. For instance, students could be encouraged to keep going out in smaller groups with friends and be provided with skills to increase the level of trust they have with their network members.

Personalized feedback interventions could also be used to address the types of hook-ups students are having. Behavioral and network information acquired about students throughout the intervention could be used to teach students how to hook-up safely. For instance, if a student is hooking-up as a Risky Partier, he or she could be encouraged to hook-up in networks similar to the Restrictive Partiers, where they are
more likely to be in a smaller network with people they know and trust and are less likely to be drinking.

**Recommendations for Future Research**

Future research into the relationship between networks, alcohol use, and hooking-up among college students should focus on the following recommendations.

1) A greater number of studies need to include a network approach within the design. This could include using a social network inventory, in which data is collected on students’ networks, or data could be gathered on full networks by surveying students who are in a group with a natural boundary, such as Greek members or athletes. This would allow researchers to specifically look at the influence of peers (e.g., Homophily and Contagion theories) and identify the role that network structures play in drinking and sexual behaviors. Furthermore, research looking at unwanted sexual experiences needs to include a network approach to fully understand how the network both facilitates unwanted sex and protects against it.

2) As previously mentioned in the Conceptual Model and Limitations sections, longitudinal data need to be collected on students and their networks as they progress through college. This would allow researchers to test the conceptual model (See Figure 5-1) to examine whether students are embedded in networks whose members are similar to themselves (i.e., Homophily) or
whether students become more similar to their network over time (i.e., Contagion). Furthermore, the researcher would be able to examine the roles that drinking and hooking-up play in the development of recreational-network structure across the college years. Examining students’ networks, alcohol use, and hooking-up behavior across multiple semesters and years would provide prevention scientists with more information on the relationship between drinking, hooking-up, and students’ recreational networks to better tailor prevention programs towards drinking and sexual assault. This would facilitate the timing of interventions before students are embedded in potentially risky networks.

3) While this current study did not examine how students’ networks differ based on their gender, this variable should be included in future analyses. Including analyses that looked at gender differences would allow researchers to understand how men and women develop their networks and whether interventions should target men and women differently.

4) Previous research has examined the role that norms play in drinking and sexual behavior. However, the peer group and peers of the same gender are used as the referent group for these norms. Future research could extend upon research by Lewis & Neighbors (2004) by using the recreational networks as the referent group instead of using same-gendered peers as the referent group. This would allow researchers to examine how norms about the recreational network affect drinking behavior and sexual behavior.
5) There is a need to explore the role that social influences play in drinking and hooking-up behavior since not all students are equally influential and equally influenced. Future research could examine whether students who see themselves as influential are more likely to belong to risky networks. Furthermore, researchers could find out if influential students are encouraging drinking within the partying networks, or if students who are less influential are the ones trying to conform to the partying networks.

**Conclusion**

In summary, these findings suggest that: 1) students develop distinct weekend recreational networks, 2) some recreational networks are more vulnerable to risky drinking and hooking-up than others, 3) students’ recreational networks are varied and dynamic, and 4) students may seek out a certain type of network depending on what behaviors they would like to engage in. The identification of these networks is the first step towards a better understanding of the structure of the social environment that students are embedded in during the weekend. Using a social network approach and person-centered analyses has the potential for the development of more targeted prevention programs for alcohol use and hooking-up that focus on teaching students how to develop healthy and safe recreational networks.
Appendix A
Alternative Assignment

Please read the article, “The Transition to College: Diverse Students, Diverse Stories,” (Terenzini, Rendon, Upcraft, Millar, Allison, Gregg, & Jalomo, 1994) then formulate a 1-page single-space written response about your experience transitioning to college and relate it to the article.
Appendix B
HUDSoN

Friday (Time 1 Survey)
Thank you for participating in this study. By participating you have agreed to complete a questionnaire during the weekend on Friday, Saturday and Sunday. On each day please complete the questionnaire before 6pm or dinner time whichever one is first. Today is day 1 of the questionnaire it is anticipated to take 20-30 minutes to complete.

In the first part of the questionnaire you will be answering questions about yourself. In another part you will answer questions about people who you hang out with, what you did with them last night (Thursday), various experiences, and health behavior.

Just a reminder, please complete this questionnaire before dinner or 6pm Friday.

Questions about you:

1) Which class are you in?
   a. CAS
   b. BBH
   c. Neither

2) How old are you?
   a. (open ended)

3) How many semesters, as an undergraduate have you been here at Penn State either at main or branch campuses?
   a. 1-2 (Freshman)
   b. 3-4 (Sophomore)
   c. 5-6 (Junior)
   d. 7-8 (Senior)

4) Scale Yes, No, Are you a(n)...?
   a. Transfer Student
   b. International Student

5) What is your gender
   a. Male
   b. Female
   c. Transgender
   d. Gender queer
   e. other
6) What is your sexual orientation?
   a. Straight
   b. Gay
   c. Lesbian
   d. Bisexual
   e. Queer
   f. other

Please state how much you agree or disagree with the following statements (these will be mixed in the final survey)

Strongly agree, agree, neutral, disagree, strongly disagree

7) I’m often the link between friends in different groups C
8) I often find myself introducing people to each other C
9) I try to bring people I know together when I think they would find each other interesting C
10) I frequently find that I am the connection between people who would not otherwise know one another C
11) The people I know often know each other because of me C
12) I am good at thinking of multiple ways to explain my position on an issue P
13) When in a discussion, I am able to make others see my side of the issue P
14) I am able to adapt my method of argument to persuade someone P
15) I can effortlessly offer multiple perspective on an issue which support my position P
16) More often than not, I am able to convince others of my position during an argument P
17) When I know something about a healthy lifestyle topic, I feel it is important to share that information with others M
18) I like to be aware of the most up-to-date healthy lifestyle information so I can help others by sharing when it is relevant M
19) If someone asked me about a healthy lifestyle issue that I was unsure of, I would know how to help them find the answer M
20) Being knowledgeable enough about healthy lifestyles so that I could teach someone else is important to me M
21) People often seek me out for answers when they have questions about a healthy lifestyle issue M
These next few questions are about your beliefs and attitudes towards drinking alcohol. Please answer the questions the best you can.

Scale: 0, 1-3, 4-5, 6-9, 10+ drinks (used for questions 20)

22) On Friday night I intend to drink _____ drinks (behavioral intentions)
   For the purpose of this questionnaire one drink is considered one shot, 12 oz of beer, or a 5 oz glass of wine. So if you are intending to have a rum and coke with 3 shots that would be considered 3 drinks. Please remember the number of drinks you choose, the survey will refer to this number in future questions.

For these next set of questions please state how much you agree or disagree with the following statements. Some of these questions are based on the number of drinks you intend to drink.

   Strongly agree, Somewhat agree, Neutral, Somewhat disagree, Strongly disagree

23) On Friday night I am confident that I can stick to drinking my intended number of drinks
24) Having my intended number of drinks will help me to have more fun
25) In general I feel drinking my intended number of drinks will be a lot of fun
26) The people who I plan to go out with tonight will want me to have my intended number of drinks
27) The amount of alcohol I drink is totally up to me
28) When I party, most PSU students would approve of me having my intended number of drinks
29) Most PSU students stick to drinking the same amount as my intended number of drinks

(Same Scale)

These next few questions about your beliefs and attitudes towards making out with someone you are not emotionally committed to. For the purpose of these questions when making out is used, it means with someone you are not emotionally committed to.

30) On Friday night I intend to make out with someone I am not emotionally committed to.
31) In general making out with someone I am not emotionally committed to would be a lot of fun
32) On Friday, the people who I plan to go out with will want me to make out with someone
33) Thinking of my friends who I hang out with, I would say most of them have made out with people who they are not emotionally committed to.
34) On Friday, it would be totally up to me to make out with someone if I wanted to.
35) On Friday, I am confident that I'll be able to make out with someone if I wanted to.
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<table>
<thead>
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<tbody>
<tr>
<td>36) If I wanted to, making out with someone will help me to have more fun.</td>
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<tr>
<td>37) Most Penn State students would approve of me making out with someone.</td>
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<tr>
<td>38) The people who I plan to go out with on Friday will be making out with someone.</td>
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<tr>
<td>(Same Scale)</td>
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</table>

These next few questions about your beliefs and attitudes towards having oral sex with someone you are not emotionally committed to. For the purpose of these questions when having oral sex is used, it means with someone you are not emotionally committed to.

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<table>
<thead>
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<tbody>
<tr>
<td>39) On Friday night I intend to have oral sex with someone I am not emotionally committed to.</td>
<td></td>
</tr>
<tr>
<td>40) In general having oral sex with someone I am not emotionally committed to would be a lot of fun.</td>
<td></td>
</tr>
<tr>
<td>41) On Friday, the people who I plan to go out with will want me to have oral sex with someone.</td>
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</tr>
<tr>
<td>42) Thinking of my friends who I hang out with, I would say most of them have had oral sex with people who they are not emotionally committed to.</td>
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<tr>
<td>43) On Friday, it would totally up to me to have oral sex with someone if I wanted to.</td>
<td></td>
</tr>
<tr>
<td>44) On Friday, I am confident that I’ll be able to have oral sex with someone if I wanted to.</td>
<td></td>
</tr>
<tr>
<td>45) If I wanted to, having oral sex with someone will help me to have more fun.</td>
<td></td>
</tr>
<tr>
<td>46) Most Penn State students would approve of me having oral sex with someone.</td>
<td></td>
</tr>
<tr>
<td>47) The people who I plan to go out with on Friday will be having oral sex with someone.</td>
<td></td>
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<tr>
<td>(Same Scale)</td>
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</tbody>
</table>

These next few questions about your beliefs and attitudes towards having penetrative sex with someone you are not emotionally committed to. For the purpose of these questions when having penetrative sex is used, it means with someone you are not emotionally committed to.

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<table>
<thead>
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</thead>
<tbody>
<tr>
<td>48) On Friday night I intend to have penetrative sex with someone (intentions)</td>
<td></td>
</tr>
<tr>
<td>49) Thinking of my friends who I hang out with, I would say most of them have had penetrative sex with people who they are not emotionally committed to.</td>
<td></td>
</tr>
<tr>
<td>50) In general having penetrative sex with someone I am not emotionally committed to would be a lot of fun.</td>
<td></td>
</tr>
<tr>
<td>51) On Friday, it would be totally up to me to have penetrative sex with someone if I wanted to.</td>
<td></td>
</tr>
<tr>
<td>52) On Friday, the people who I plan to go out with will want me to have penetrative sex with someone.</td>
<td></td>
</tr>
<tr>
<td>53) On Friday, I am confident that I’ll be able to have penetrative sex with someone if I wanted to.</td>
<td></td>
</tr>
<tr>
<td>54) Having penetrative sex with someone will help me to have more fun.</td>
<td></td>
</tr>
<tr>
<td>55) Most Penn State students would approve of me having penetrative sex with someone.</td>
<td></td>
</tr>
<tr>
<td>56) The people who I plan to go out with on Friday will be having penetrative sex with someone.</td>
<td></td>
</tr>
</tbody>
</table>
Questions about the people you hang out with:

Thank you for participating in this study. This is the second part of the survey. This part of the questionnaire is designed to help us find out who the people are in your social circle during the weekend. We are interested in all the people who you hung out with on Thursday night. When you think about how you spent your time from dinner until you went to sleep last night (Thursday), who did you spend time with? In order to help you remember, these people could be roommates, friends, romantic partners, anyone else who made an impression on you, people who spend time in your dorm/house, study group members.

Now think specifically about who you hung out with. Please write down the first name for those people you hung out with. For example if you hung out with your roommate and their name is Sara Silverson please put in Sara. If you happen to have hung out with two people named Sara please create a pseudo last name for them, some way for you to tell these two people apart. For example if one Sara is tall, you could put Sara Tall and Sara Small as a way for you to distinguish between the two Saras. If you hung out with someone you just met and don’t remember their name you can put something like “woman on bus”, or “man with brown hair” in the first name field. Just make sure to remember the description you put for future surveys.

Below are detailed directions of how to enter in the names of people who you hung out with into the survey. Please read the directions carefully. In order to enter name please go to the bottom of the webpage and hit “add new.” Then put the names of the people you hung out with in the appropriate name fields as described above.

(Participants will now ENTER NAMES this should be able to be done in a matrix for various questions in CIKNOW-for researcher only)

These next set of questions are about the people you hung out with, for example what they like, how you met, what relationship you have with them. Please answer the questions as best you can. The names of people you entered previously will automatically appear for each question.

57) What is the gender of ________?
   a. Male
   b. Female
   c. Other

58) Which U.S. census group does ________ belong to?
   a. Black
   b. White
   c. Hispanic
   d. Asian
   e. American Indian
   f. Alaska Native
   g. Pacific Island
   h. African American
   i. Mixed Race
   j. Other
59) What is your best guess of how old ________ is?
   a. 17-20 (they can’t legally drink)
   b. 21-22 (can legally drink)
   c. 23-24 (maybe they are almost done with school or just graduated)
   d. 25-26 (maybe they are out of school or a graduate student)
   e. 27 or older

60) What is your best guess of how many semesters they have been at Penn State?
   a. 1-2 (Freshman)
   b. 3-4 (Sophomore)
   c. 5-6 (Junior)
   d. 7-8 (Senior)
   e. Not in school

61) (Scale Y/N) is______a(n)
   a. Transfer student
   b. International student

62) Does _______ live in your same dorm or apartment (are you neighbors, but not roommates)?
   a. Yes
   b. No

63) In what setting did you first meet________? (check all that apply)
   a. Class
   b. Social
   c. Party
   d. LEAP
   e. Sorority/ Fraternity
   f. Relative/family
   g. Hometown before college
   h. Dorm
   i. Online
   j. Dating service
   k. Other

64) How did you make contact with________? (check all that apply)
   a. on my own (not through another person)
   b. through a friend
   c. through an acquaintance (someone you just met, but aren’t friends with)
   d. through a friend of a friend (someone who is specifically a friend of one of your friends)
   e. other
65) What is the nature of your relationship with_____ (check all that apply)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>a.</td>
<td>Classmate</td>
</tr>
<tr>
<td>b.</td>
<td>Friend</td>
</tr>
<tr>
<td>c.</td>
<td>romantic partner</td>
</tr>
<tr>
<td>d.</td>
<td>relative</td>
</tr>
<tr>
<td>e.</td>
<td>professor</td>
</tr>
<tr>
<td>f.</td>
<td>grad student</td>
</tr>
<tr>
<td>g.</td>
<td>coach</td>
</tr>
<tr>
<td>h.</td>
<td>drinking buddy</td>
</tr>
<tr>
<td>i.</td>
<td>smoking buddy (cigarettes)</td>
</tr>
<tr>
<td>j.</td>
<td>acquaintance</td>
</tr>
<tr>
<td>k.</td>
<td>study buddy</td>
</tr>
<tr>
<td>l.</td>
<td>other</td>
</tr>
</tbody>
</table>

66) About how much time did you spend with each person last night (Thursday night)?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>a.</td>
<td>1 hour or less</td>
</tr>
<tr>
<td>b.</td>
<td>2 hours</td>
</tr>
<tr>
<td>c.</td>
<td>3-4 hours</td>
</tr>
<tr>
<td>d.</td>
<td>5-6 hours</td>
</tr>
<tr>
<td>e.</td>
<td>All night</td>
</tr>
</tbody>
</table>

These next few questions will be about each of the people you hung out with.

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Mostly</th>
<th>Completely</th>
</tr>
</thead>
</table>

67) How much do you like this person? (not in a romantic way)
68) How much do you want to be liked by this person?
69) How much do you feel comfortable with this person?
70) How similar are you to this person?
71) How much do you trust this person?

The next part of the survey will be a few questions about what you did with each person on Thursday night and what each of the people did with each other. Remember you can only pick from the list of people you said you hung out with.

Answers will be YES, NO unless otherwise indicated

72) Last night did _______ help you with (check all that apply)

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</thead>
<tbody>
<tr>
<td>a.</td>
<td>School work</td>
</tr>
<tr>
<td>b.</td>
<td>Chores (like cleaning your dorm or apartment)</td>
</tr>
<tr>
<td>c.</td>
<td>making a meal</td>
</tr>
<tr>
<td>d.</td>
<td>loan you something like money or clothes</td>
</tr>
</tbody>
</table>
73) Last night did _______ help anyone else while you were all together with something like homework, chores or making a meal
   a. Check all names that apply

74) Last night did _______
   a. Give you any advice
   b. Listen to you when you needed to talk

75) Last night did you
   a. Confide in them
   b. Turn to them for suggestions

76) Last night did_______ give advice, listen to, confined in, give suggestions to anyone else while you were all together
   a. Check all names that apply

77) Last night did_______
   a. Give you a hug
   b. Show you affection

78) Last night did_______ give a hug, or show affection to anyone else while you were all together
   a. Check all names that apply

79) Last night did you and _________
   a. Have a good time together
   b. Get together and relax
   c. Do something enjoyable together

80) Last night did_______ have a good time, get together and relax, or do something enjoyable with someone else while you were all together
   a. Check all names that apply

81) Last night did you have a fight or argument with _______?

82) Last night did _______ have a fight or argument with anyone else while you were all together?
   a. Check all names that apply

Exercise, eat, study, social activity (movie, dorm social), apartment/dorm party, fraternity or sorority party, organization meeting (which one, check all that apply)

83) What activities did you do with _________? (check all that apply)

84) What activities did they do with each other?

These next two questions are about who you started the night with and ended the night with. Answer them to the best of your ability. It may help to take a few moments and think back through the course of the evening.

85) Who did you start the night out with? Check all names that apply or Yes and No depending on question structure

86) Who did you end the night with? Check all names that apply or Yes and No depending on question structure
You are close to the end, this next set of questions are about what specific activities you may have done with each person and/or as a group. Answer as best you can. Remember you can only pick from the list of people you said you hung out with.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers will be YES, NO unless otherwise indicated</th>
</tr>
</thead>
</table>
| 87) Did you drink 0,1-3,4-5, 6-9, 10 or more drinks, remember a drink is 1 oz beer, or a 5 oz glass of wine | 88) Who drank alcohol last night, when you were hanging out?  
  a. (check all that apply)(put in # of drinks 0,1-3,4-5, 6-9, 10 or more) |
| 89) Did you smoke cigarettes last night?                                   | 90) Who smoked cigarettes last night when you were all hanging out?  
  a. (Check all that apply) |
| 91) Did you use any other drug last night?                                 | 92) Who else used any other drugs last night when you were hanging out?  
  a. (Check all that apply) |
| 93) Did you make out with someone who you are not emotionally committed to last night? | 94) Did you make out with someone you hung out with last night?  
  a. Check all names that apply |
| 95) Who else made out with someone they are not emotionally committed to last night? | 96) Did you have oral sex with someone who you are not emotionally committed to last night?  
  a. Check all names that apply |
| 97) Did you have oral sex with some you hung out with last night?          | 98) Who else had oral sex with someone they are not emotionally committed to last night?  
  a. Check all names that apply |
| 99) Did you have penetrative sex with someone who you are not emotionally committed to last night? | 100) Did you have penetrative sex with someone you hung out with last night?  
  a. (Check all that apply) |
| 101) Who else had penetrative sex with someone they are not emotionally committed to last night? (check all that apply) | 102) Did anyone touch, fondle, kiss you last night when you did not want them to?  
  a. Check all names that apply |
| 103) Did anyone that you hung out with last night touch, fondle, kiss you last night when you did not want them to? | 104) Who else had someone touch, fondle, kiss them last night when they did not want to?  
  a. (Check all that apply) |
| 105) Did anyone have penetrative sex with you last night when you did not want them to? |
106) Did anyone that you hung out with last night, have penetrative sex with you when you did not want them to?
   a. Check all names that apply

107) Who else had someone have penetrative sex with them when they did not want them to?
   a. Check all names that apply

You are almost done, there are just a few more questions left about yourself, your experiences and health behaviors.

The next few questions are about your use of alcoholic beverages for example beer, liquor, wine, etc. and smoking. A drink is considered on shot, 12 oz of beer, or a 5 oz glass of wine. So if you have rum and coke that has 3 shots you would count that as 3 drinks. Please read the questions carefully and answer them the best you can

108) How often do you have a drink containing alcohol?
   a. Never (if possible skip subsequent questions)
   b. Monthly or less
   c. 2-4 times a month
   d. 2-3 times a week
   e. 4 or more times a week
   f. Daily

109) How many drinks containing alcohol do you have on a typical day when you drinking?
   a. 1 or 2
   b. 3 or 4
   c. 5 or 6
   d. 7, 8, or 9
   e. 10 or more

110) How often do you have five or more drinks in one sitting or occasion?

111) Do you smoke at least one cigarette daily?

112) Do you smoke when you drink alcohol?
These next few questions are about sexual behavior and experiences that you may have had in your life please answer these questions to the best of your ability.

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<tr>
<td>None</td>
<td>1-3</td>
<td>4-7</td>
<td>8-12</td>
<td>13-20</td>
<td>21 or more</td>
<td></td>
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<tr>
<td>113) About how many people have you made out with when you were not emotionally committed to that person?</td>
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<tr>
<td>114) About how many people have you had oral sex with when you were not emotionally committed to that person?</td>
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<tr>
<td>115) About how many people have you had penetrative sex with when you were emotionally committed to that person?</td>
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<tr>
<td>116) About how many people have you had penetrative sex with when you were not emotionally committed to that person?</td>
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|   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |
| 117) Which U.S. census group do you identify with? |   |   |   |   |   |   |
| a. Black |   |   |   |   |   |   |
| b. White |   |   |   |   |   |   |
| c. Hispanic |   |   |   |   |   |   |
| d. Asian |   |   |   |   |   |   |
| e. American Indian |   |   |   |   |   |   |
| f. Alaska Native |   |   |   |   |   |   |
| g. Pacific Island |   |   |   |   |   |   |
| h. African American |   |   |   |   |   |   |
| i. Mixed |   |   |   |   |   |   |
| j. Other |   |   |   |   |   |   |
# Appendix C

**HUDSoN Question Type and Variable Measured**

<table>
<thead>
<tr>
<th>Question Type</th>
<th>Variable</th>
<th>Question #</th>
<th>Time Points</th>
</tr>
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<tbody>
<tr>
<td>Demographic</td>
<td>Which class CAS or BBH (participant)</td>
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<td>1</td>
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<tr>
<td>Demographic</td>
<td>Age (participant)</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Demographic</td>
<td>Class status (participant)</td>
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<tr>
<td>Demographic</td>
<td>Transfer or international (participant)</td>
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<tr>
<td>Demographic</td>
<td>Gender (participant)</td>
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<tr>
<td>Demographic</td>
<td>Sexual orientation (participant)</td>
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<tr>
<td>Demographic</td>
<td>Census group (participant)</td>
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<tr>
<td>Social Maven</td>
<td>15 item scale (participant)</td>
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<tr>
<td>Drinking Intentions</td>
<td>Drinking Intentions (participant)</td>
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<td>1-3</td>
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<td>Subjective norm (participant)</td>
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<td>University injunctive norm (participant)</td>
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<td>University descriptive norm (participant)</td>
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<td>Attitudes Toward Drinking</td>
<td>Attitudes Toward Drinking (participant)</td>
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<td>Attitudes Toward Drinking (participant)</td>
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<td>1-3</td>
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<td>Perceived Control</td>
<td>Perceived Control (participant)</td>
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<td>1-3</td>
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<td>Intentions to make out (participant)</td>
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<td>Intentions to engage in oral sex (participant)</td>
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<td>1-3</td>
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<td>Intentions to engage in penetrative sex (participant)</td>
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<td>Hooking-up Norms</td>
<td>Norms for making out (participant)</td>
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<td>Hooking-up Norms</td>
<td>Descriptive university norm for making out (participant)</td>
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<td>1</td>
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Appendix D
Informed Consent for Health Classes

The Pennsylvania State University

Title of Project: Recreational Activities of College Students

Principal Investigator: Brea Burger, M.S.
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Patricia Koch, PhD
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1. **Purpose of the Study:** The purpose of this research study is to explore the recreational activities of college students, and their social circles. Various recreational activities, thoughts and beliefs about these activities as well as who participated in various activities will be asked. These include social activities like studying, socials, parties, alcohol use, dating/sexual behavior, and how these aforementioned aspects influence unwanted sexual experiences.

2. **Procedures to be followed:** You will be asked to complete 3 surveys over the course of a weekend; one survey on Friday, another on Saturday, and the final survey on Sunday. The questions within the survey will mainly focus on your attitudes and beliefs about various college recreational activities. You will also be asked who you hung out with each night and what you activities you participated in. You will not need to directly identify people you hung out with, you be asked to create pseudonyms for people you hung out with. For example if you hung out with Sara you would give her a fake name for the survey like Kelly. The link to the online survey is at the end of this email. By continuing on to the survey, reading this consent form, and clicking the agree button you are consenting to participate. Please complete this survey online in a private environment by yourself.

3. **Discomforts and Risks:** There are minimal risks in participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort. However you have the right to skip any questions within the survey. You may also contact the researcher about any concerns, or feelings that you have about the study. You may also contact Counseling and Psychological Services (CAPS) at 814-863-0395.
The survey does ask about illegal activity such as but not limited to underage drinking behavior, drug use, and some criminal activity, however, your name is not directly linked to that information. The only connection between you and this survey is your email address which is used to give you extra credit. Your email address is kept separate from any data that is collected and is linked only by the personal identification number (PIN) assigned to you for survey login. The list that links the PIN to your email address is kept on a password protected computer, separate from the data, and will be permanently destroyed removing any connection between you and the survey once extra credit has been given. However, this information could be pose a legal risk if your email information were to be linked to the survey and this became known.

4. **Benefits:** You might learn more about yourself by participating in this study and gain a better understanding of your beliefs about various recreational activities. You may also become aware of your behavior and gain access to resources to help you change your behavior and/or to get support for sexual experiences.

The benefits to society include having a better understand of what college students’ social networks look like and what recreational activities college students are participating in. This research will bring to light some of the connections between alcohol use, sexual/dating behavior, and their social groups in college and how these aspects influence unwanted sexual experiences for college students. This can inform current interventions and resources available to students at Penn State.

5. **Duration:** It will take about 20-30 minutes to complete each the first survey and 15-20 minutes to complete the second and third survey.

6. **Statement of Confidentiality:** Your participation in this research is confidential. The survey does not ask for any information that would identify who the responses belong to. You will be emailed a random personal identification # (PIN) for survey login and a password (which you are prompted to change upon login). This number will be used to keep track of survey completion so you receive extra credit. Also, any names of pseudo names of social network members will be assigned a random number when the data are downloaded. The data will be stored and secured at the researcher’s office in a locked filing cabinet and password protected file on the computer. The Pennsylvania State University’s Office for Research Protections, the Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses. Your confidentiality will be kept to the degree permitted by the technology used, therefore no guarantees can be made regarding the interception of data sent via the Internet by any third parties.

7. **Right to Ask Questions:** Please contact Dr. Rachel Smith at 814-863-0030 or Dr. Patricia Koch at (814) 863-0190 with questions or concerns about this research. You can also call this number if you feel this study has negatively affected you. If you have any questions or concerns about your rights as a research participant or would like to offer suggestions on this topic, please contact The Pennsylvania State University’s Office for Research Protections (ORP) at (814) 865-1775. The ORP cannot answer questions about the specific research
procedures of this study. Questions about research procedures can be answered by the research team.

8. **Payment for participation:** Participants will receive prorated extra credit points for their BBH course. You will receive .5% extra credit at time one, .5% at time two, and 1% extra credit at time three. There is another option to participating to receive the extra credit. You will read a research article posted on your ANGEL website and email the PI a 1-page written response. The written response should be about college transition and how it relates to the article. The alternative assignment is expected to take approximately 70 minutes to complete and you will receive 2 % extra credit for the alternative assignment. This option is posted on your BBH ANGEL website. If you would like to complete the alternative assignment please go to ANGEL and to access the article and follow the directions.

9. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to take part in this research study.

Completion and submission of the survey implies that you have read the information in this form and consent to take part in the research.

Please save a copy of this form for your records or future reference.
Appendix E
Informed Consent for Communication Class

Title of Project: Recreational Activities of College Students

Principal Investigator: Brea Burger, M.S.
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Patricia Koch, PhD
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The Pennsylvania State University
University Park PA 16802
P3K@psu.edu
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10. Purpose of the Study: The purpose of this research study is to explore the recreational activities of college students, and their social circles. Various recreational activities, thoughts and beliefs about these activities as well as who participated in various activities will be asked. These include social activities like studying, socials, parties, alcohol use, dating habits, and sexual behavior.

11. Procedures to be followed: You will first be asked to create a user ID and password, please create one that you will remember over the next three days. You will be asked to complete 3 surveys over the course of a weekend; one survey on Friday, another on Saturday, and the final survey on Sunday: The survey questions focus on your attitudes and beliefs about various college recreational activities, what you did each night and who was with you. Please complete this survey online in a private environment by yourself on a large monitor computer.

12. Discomforts and Risks: There are minimal risks in participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort. However you have the right to skip any questions within the survey. You may also contact the researcher about any concerns, or feelings that you have about the study. You may also contact Counseling and Psychological Services (CAPS) at 814-863-0395.

The survey does ask about illegal activity such as but not limited to underage drinking behavior, drug use, and some criminal activity, however, your name is not directly linked to
that information. However, while there is no direct connection between you and the survey data, if you decide to disclose this information to others, it could pose a legal risk to you.

13. **Benefits:** You might learn more about yourself by participating in this study and gain a better understanding of your beliefs about various recreational activities. You may also become aware of your behavior and gain access to resources to help you change your behavior and/or to get support for sexual experiences.

The benefits to society include having a better understanding of what college students’ social networks look like and what recreational activities college students are participating in. This research will bring to light some of the connections between alcohol use, sexual/dating behavior, and their social groups in college and how these aspects influence unwanted sexual experiences for college students. This can inform current interventions and resources available to students at Penn State.

14. **Duration:** It will take about 20-30 minutes to complete each of the first survey and 15-20 minutes to complete the second and third survey. Therefore the total time to complete the survey is 60-70 minutes.

15. **Statement of Confidentiality:** Your participation in this research is confidential. There is no direct connection between you and the data in the survey since you create your own confidential login and password to the survey. RePaSS only records that you clicked on the survey link; there is no recorded connection between you and your answers. You will not need to directly identify the people you hung out with; instead, you be asked to create pseudonyms for people. For example, if you hung out with Jane Doe you would give her a fake name for the survey like “pumpkinhead”. In addition, we will recode all pseudonyms you create with random numbers when the data are downloaded. The data will be stored and secured at the researcher’s office in a locked filing cabinet and password protected file on the computer. The Pennsylvania State University’s Office for Research Protections, the Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses. Your confidentiality will be kept to the degree permitted by the technology used; therefore no guarantees can be made regarding the interception of data sent via the Internet by any third parties.

16. **Right to Ask Questions:** Please contact Dr. Rachel Smith at 814-863-0030 or Dr. Patricia Koch at (814) 863-0190 with questions or concerns about this research. You can also call this number if you feel this study has negatively affected you. If you have any questions or concerns about your rights as a research participant or would like to offer suggestions on this topic, please contact The Pennsylvania State University’s Office for Research Protections (ORP) at (814) 865-1775. The ORP cannot answer questions about the specific research procedures of this study. Questions about research procedures can be answered by the research team.

17. **Payment for participation:** You will be compensated for your participation through course credit in the amount of 2% of your final grade. If you do not wish to take part in this study you may still receive course credit by participating in an alternative assignment by contacting
Dr. Rachel Smith before the CAS100a research deadline (August 1, 2013). The alternative option to survey participation is to read an article on transitioning to college and write an essay about your own college transition relating it to the article. The essay will take no more than 60-70 minutes to complete, which is equivalent to the survey. Your CAS100 instructor is only informed that you will receive the course credit.

18. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to take part in this research study. Hitting the “next” button implies that you have read the information in this form and consent to take part in the research, if you do not agree please log out. Please print a copy of this form for your records.
References


Farhi, F. (2010). Sexual violence on our campus: Understanding the barriers that prevent undergraduate Penn State students from accessing supportive resources. *(Honors Thesis).*


VITA
Brea Desiree Burger

Education

Doctoral of Philosophy, Biobehavioral Health Expected 2014
Research Advisor: Dr. Patricia Koch
The Pennsylvania State University

Master of Science, Marriage and Family Therapy 2009
University of Rhode Island

Bachelor of Science, Psychology, Minor Sociology 2007
Magna cum laude
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Awards and Fellowships

Prevention and Methodology Predoctoral Training Fellow 2011-2014
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The Pennsylvania State University

Hintz Graduate Education Enhancement Fellowship 2012-2013
Department of Biobehavioral Health
The Pennsylvania State University

Society for the Scientific Study of Sexuality Student Ambassador 2010-2011

Publications

Koch, P.B., & Burger, B.D. (provisionally accepted). The impact of university sexuality courses on undergraduate students in the U.S.: A systematic literature review. Annual Review of Sex Research


