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Exploring College Student Alcohol Consumption Patterns Using Social Network Analysis

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Abstract

The college environment is often associated with an acceptance of heavy alcohol consumption, with binge drinking considered normative[17]. As college campuses continue to face dangerous consequences and high costs resulting from college student alcohol consumption, predictors of heavy drinking must be further explored. Peer norms surrounding level of peer drinking is one of the strongest predictors of alcohol consumption in college students, with students overestimating the acceptability of drunkenness and frequency of binge drinking among their peers[7]. This misperception of social norms relates to students drinking greater quantities at higher frequency[13]. The powerful role of peer norms may stem from the transition to college, as students begin to form new relationships with less influence from family and childhood friends. Moreover, behaviors such as smoking, eating habits, and alcohol consumption spread through social networks, or the set of social ties one forms among friends, family, coworkers, etc.[15]. Thus, the purpose of this study is to explore the unique social network of college students and the network's influence on alcohol consumption patterns and experience of alcohol related negative consequences. The intricate connections among college students will be examined using social network analysis. This technique creates a visual model of how college students are connected and how these connections influence individual behavior. By surveying various organizations at a midsized, midwestern university, we will create a diagram to map the web of social connections formed among college students. This diagram will be used to explore how an individual's position within a network influences his or her own drinking patterns. The results of this study will serve as an educational tool for college campuses as a way to improve alcohol misuse prevention and intervention techniques. Using a network perspective may determine key individuals ideal for an alcohol intervention with maximum impact on the social network. Results of this study will be presented to demonstrate how the social network of college students impacts alcohol consumption patterns.

Keywords: Alcohol, Consequences, Networks

1. Introduction

As alcohol abuse remains the most prevalent form of substance abuse among college campuses, its risky consequences define a continuously problematic issue[11]. Despite current prevention and intervention efforts, college students partake in the highest levels of heavy drinking and experience the largest proportion of alcohol related negative consequences compared to noncollege individuals[6]. Thus, predictors of college student alcohol consumption must be further explored in order to better understand this behavior and thus effectively decrease dangerous drinking patterns.

Social norms are among the strongest predictors of college student alcohol consumption with higher perceived peer norms associated with heavier drinking patterns[8,12]. As college students transition to increased independence, social norms weigh heavily on their decisions and behavior. For example, students report alcohol consumption

uptake in college based on the belief that is it normative in order to fit in[17]. Therefore, it is important to examine the social network of college students, or the intricate social connections formed among students during this unique point in life when peer influence may weigh heavily. Social network analysis is a method to examine the impact of social environment on an individual's behaviors, particularly how beliefs and norms among an individual's social group influence their own beliefs and behaviors[16]. By mapping the connections between individuals in a social network, a visual model can be constructed displaying how characteristics and behaviors spread through a network. With the strong influence of social norms on college student behavior, a social network perspective reveals how the social ties college students form might predict many aspects of their college experience. For example, social network data can demonstrate how an individual's social ties influence their alcohol consumption and experience of alcohol-related negative consequences.

A high rate of substance abuse among peers contributes to a higher adolescent alcohol use and problems, with the strongest association among close friends[4]. In addition, the risk of adolescents initiating alcohol use increases for each additional friend who consumes alcohol[10]. Among newly married couples, a greater number of drinking buddies is associated with frequent heavy drinking[5]. However, while substance abuse within adolescent and middle-aged adult social networks has been explored, there is a relative paucity of social network analysis of college student alcohol consumption. Thus, it is crucial to examine how alcohol consumption and its associated consequences spread through a population of college student social networks, as college students tend to partake in high levels of dangerous alcohol consumption.

Although behaviors such as smoking, eating habits, and alcohol consumption are known to spread through social networks[15], it is important to examine how positions and centrality within a network impact alcohol consumption and related negative consequences. Thus, the purpose of this study is to use social network analysis to examine how the composition of an individual's social network impacts alcohol consumption patterns and experience of alcohol-related negative consequences. Results indicate how social connections influence college student drinking behaviors. Identifying individuals with the most influence within a network provides new insight in tailoring prevention and intervention efforts to most effectively reduce the dangers of heavy alcohol consumption.

2. Methods

2.1 Participants

Participants included students at a mid-sized, mid-western university affiliated with an on-campus social organization. Data were collected from 36 respondents ranging from first-year to fourth-year students with an average age of 19.93 (SD-1.03). Majority of students were Caucasian (97.22% n-35). Annual family incomes of $80,000 or greater were reported by 77.78% (n-28), indicating participants from middle to upper class backgrounds.

2.2 Procedure

Participants were recruited to participate on a voluntary basis to complete an online survey housed by Qualtrics survey software. The email invitation was sent to all members of the participating sorority. All procedures were approved by the Institutional Review Board of the primary author. UCINET Software[2] was used in the analysis of social network data.

2.3 Measures

Participants completed a survey including close-ended measures of self-reported alcohol use and experience of alcohol-related negative consequences and measures of one's social network. Specific measures are described in the following sections

2.3.1 demographics

Participants responded to questions regarding age, year in school, academic major, ethnicity, GPA, etc.

2.3.3 alcohol consumption variables

Using the standard definition of a drink (i.e. 12 ounces of beer, one and half ounces of liquor, or a four-ounce glass of wine), participants indicated if they ever had an alcohol beverage to drink, how many days in a typical week they had at least one drinking containing alcohol, how many alcoholic drinks they consumed on a typical drinking day, and the highest number of drinks they consumed on one occasion in the last 30 days. In addition, using the Daily Drinking Questionnaire[3], participants indicated how many drinks they consumed on average for each day of the week.

2.3.4 social network

Participants were provided with a roster containing the names of all members of their organization and asked to indicate all of the members they considered their drinking buddy. A drinking buddy was defined as "an individual with whom you go drinking or to parties/bars/nightclubs with regularly." Individuals were given the option to remove their name from the roster of potential drinking buddies. Various measure of centrality were used to analyze the social network.

2.3.5 rutgers alcohol problem index

The frequency of experiencing alcohol-related negative consequences was measured using Rutgers Alcohol Problem Index[17]. The RAPI is a 23 question survey that asks participants to rank the frequency of experiencing 23 negative consequences on a scale of 0-4, where 0=never, 1=1 to 2 times, 2=3 to 5 times, 3=6 to 10 times, and 4=more than 10 times. RAPI scores represent the sum of coded numbers (0-4) across all 23 items and range from 0-92. The survey prompted participants with "Different things happen to people while they are drinking alcohol or because of their alcohol drinking. Indicate how many times each of these things happened to you within the last year[17]." Sample consequences include "went to work or school high or drunk," and "felt physically or psychologically dependent on alcohol[17]."

2.3.6 young adult alcohol consequences questionnaire

For additional assessment of alcohol-related consequences, the Young Adult Alcohol Consequences Questionnaire (YAACQ) was used[14]. This 48-item measure assesses the eight domains of consequences which include social/interpersonal, academic/occupational, risky behavior, impaired control, poor self-care, diminished self-perception, blackouts, and physiological dependence. Items are scored 0= no and 1=yes with the total YAACQ score representing the sum of coded numbers (0-1) across all 48 items and ranges from 0-48. The questionnaire prompts the participant with "Below is a list of things that sometimes happen to people either during, or after they have been drinking alcohol. Next to each item below, please indicate either yes or no whether that item describes something that has happened to you in the past year[14]." Sample items include "I have passed out from drinking," and "I have been unhappy because of my drinking."

3. Results

3.1 Alcohol Consumption Variables

Surveys indicated 100% of participants in the social network (n = 36) had ever had an alcoholic beverage to drink. In a typical week, participants indicated having at least one alcoholic beverage 2.6 days (SD = 1.06) and an average of 4.86 (SD = 1.96) drinks on a typical drinking day. For the 30 days prior to the survey, the average highest number of drinks on a single drinking occasion was 7.66 drinks (SD = 3.38). Participants reported an average of 3.42 (SD = 1.27) binge drinking occasions (5 or more drinks in a row for males, 4 or more for females) in the last 30 days.

3.2 Alcohol Related Consequences

The social network had an average RAPI score of 11.14. (*SD* = 8.71) and an average YAACQ score of 16.56 (SD=11.05).

3.3 Social Network Analysis

Using UCInet to analyze the network structure, the resulting network had an average degree of 4.19, density of .12, six components, connectedness of .81, an average distance of 3.10 (SD = 1.59), and a diameter of 9. The network transitivity was 16.43% and the eigenvector centralization was 35.42%. One measure of centrality, betweenness, was significantly related to alcohol problems (RAPI), $r(36) = -.33$, $p<.05$ .Another measure of centrality, closeness, was significantly related to typical number of drinks, $r(35) = .41$, $p = .02$. These values measure the nature of connectedness among individuals in the social network.

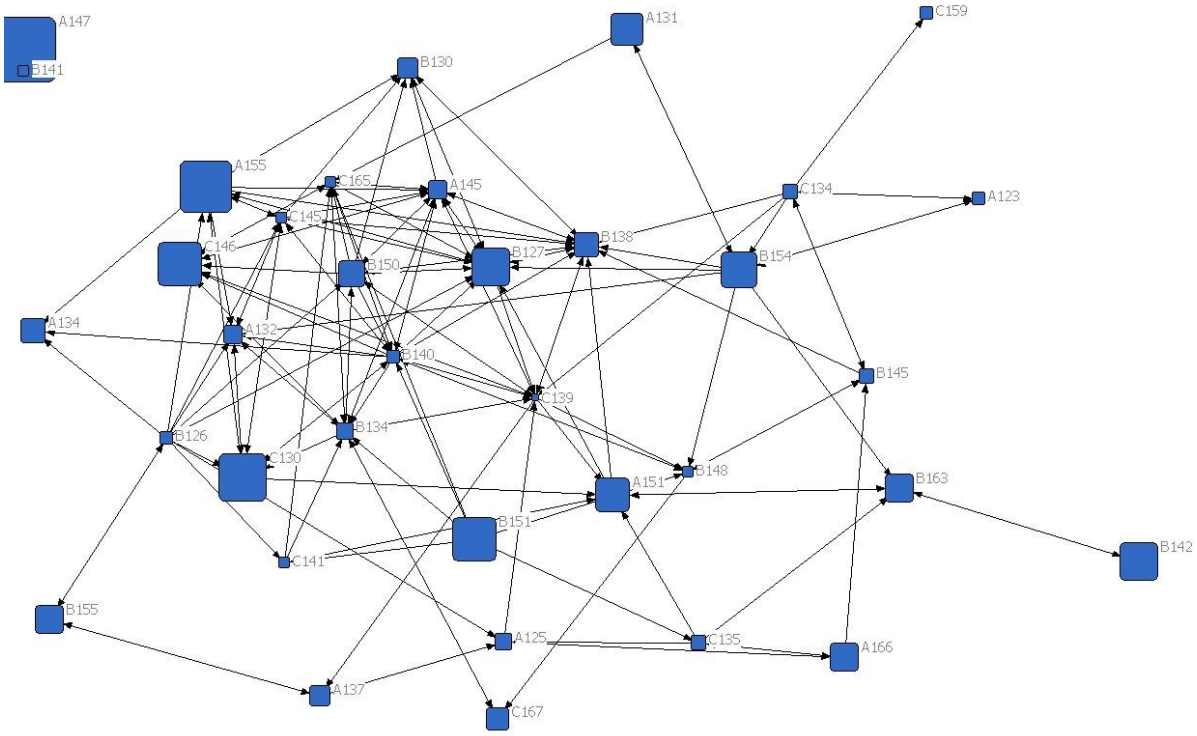

Figure 1. social network of an on-campus social organization and associated RAPI score

The resulting picture of the social network structure (Figure 1) demonstrates the connections among members of the organization. In Figure 1, individuals are indicated by nodes. The larger nodes reported higher levels of alcohol-related negative consequences as measured by the RAPI, while smaller nodes reported less alcohol-related negative consequences.

4. Discussion

This social network analysis revealed alcohol consumption patterns and alcohol-related negative consequences are influenced by an individuals' social ties. The network has an average degree of 4.19, meaning participants have on average 4 drinking buddies within the network. The network has six components, or six groups of drinking buddies

within the network. This suggests the network has clusters of individuals who drink together. The average distance of 3.10 indicates there is an average of three links between each node and with a diameter of 9, the furthest connections are only separated by 9 nodes. Overall, the individuals within the network were highly connected, with a connectedness of 0.81.

Closeness centrality was significantly related to number of drinks, indicating individuals who typically drink higher amounts are closer in the network. In addition, betweeness centrality was significantly related to alcohol problems, suggesting that individuals who connect other members of the network have lower alcohol problems. In other words, these individuals have ties to individuals within the network who aren't necessarily tied to one another. Perhaps these individuals who are connecting members within the network are serving as caretakers for the social ties, spending more time caring for their friends who are consuming large amounts of alcohol and experiencing alcohol-related negative consequences than consuming alcohol themselves. Individuals who experience low frequency of alcohol-related negative consequences tend to still have many individuals who considered them their "drinking buddy" (Figure 1). It is possible that although these individuals have several nodes who nominated them as a "drinking buddy," these individuals are actually serving to control or watch over their friends as they partake in heavy drinking.

This social network analysis revealed the influence of college student's social network on individual's alcohol consumption patterns. These findings add important considerations to previous research. The relation between alcohol consumption and individual's social ties suggest that college students may be similar to adolescents and feel the need to conform to the norms of their social network in order to increase popularity[1]. This social network analysis also reaffirms the idea that college students are more likely to uptake alcohol consumption because it is normative in order to fit in with their peers[17]. In this study, participants who consumed a higher number of drinks were closer in the network. Perhaps within these subgroups of the network where high levels of alcohol consumption occurs individuals hold social norms that their social connections drink heavily, and therefore they must reciprocate the behavior to fit in. This relates to previous research which demonstrated that the more strongly an individual associates with a group the stronger the association between perceived norms for drinking and the individuals own drinking[12]. Since students' perceived norms for frequency of alcohol consumption are approximately double the actual reported frequency[9], it is important for social groups to become more familiar with the beliefs and norms within their network. Perhaps prevention efforts can be targeted to social groups as a whole or force individuals to consider how their social ties influence their own behavior. Intervention efforts can also improve by asking individuals to map out their social network and determine who they feel has the most influence on their beliefs. Targeting highly influential people may be beneficial to alter the social norms in the network.

Although the network had a low density, transitivity, and eigenvector centrality, this may be because only one-third of the organization is represented in the network. With a higher response rate, more drinking buddies would be present and available to choose. Also, because this analysis only studied connections within a single organization, participants may have drinking buddies outside this network whose influence is not accounted for. Thus, those who appear as isolates or pendants may indeed be connected to heavy drinkers or abstainers outside the network. Another limitation of this study is participants represent students from only a single university with little ethnic or economic diversity.

Overall, examining this college student social network revealed important patterns within a network of college students which can be used to improve alcohol education techniques. Further research should expand upon the current findings to further understand how college student social networks influence alcohol consumption patterns and other health-related behaviors.

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