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# Consequences and Peer Influence as Proximal and Contextual Factors in Alcohol Consumption

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## Abstract

The present study examines the role of positive and negative consequences and peer influence as proximal and contextual variables that influence drinking in college students. Data from a sample of 1482 students who completed the CORE survey in 2006 and 2007 were utilized to test three models predicting the likelihood of alcohol use in the 30 days prior to survey completion. The final model reflected the best fit of the data and indicated that both positive and negative consequences were positively associated with a greater likelihood of drinking while freshman standing and being a racial and ethnic minority were negatively associated. Two variables assessing the influence of peer pressure were also significant in the final model, suggesting that peer pressure continues to play a role in drinking behavior, even when controlling for the role of consequences. The implications of the findings for interventions are discussed.

## Key Words

Alcohol consumption, College students, peer influence, negative consequences, positive consequences

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### **Introduction**

Studies have consistently shown that consumption of alcohol has been a long-standing issue of concern with college populations across the US. O'Malley and Johnston (2002) reported the findings of 5 different survey studies done over a period ranging from 1994 to 2001. All these surveys found that a large proportion of college students in America report alcohol abuse issues. The outcomes associated with drinking are also well documented. They include devastating damages (Perkins, 2002) including death (Hingson et al., 2005) and those that are pertinent to student life and future, such as poor grades or reduced academic performance, and absence from classes (Wechsler, Kuo, Lee & Dowdall, 2000). Other serious outcomes include sex crimes and motor vehicle accidents.(Gross & Billingham, 1998). Research has found that motives for drinking are associated with socio demographics traits including gender, age, and race; individual attributes, such as family history and personality traits like extroversion, sensation seeking, and anxiety; while contextual motives include neighborhood access and pricing of drinks (Park, Sher, Wood & Krull, 2009). The complexity of college cultures, increasingly diverse demographics, and the multiplicity of environmental influencers are proposed as likely reasons for why the successful prevention and amelioration of the problem remains a goal of college wellness programs despite the extensive research in this field (Presley, Meilman & Leichliter, 2002).

The present study primarily examines the role of positive and negative consequences and peer influence as proximal and contextual variables that influence drinking in college students. The study also examines peer group opinion as both a contextual and a distal factor that influences drinking and drinking patterns.

### **Literature Review**

The literature on alcohol use and abuse is extensive. Current research studies report that alcohol consumption ranges from heavy binge drinking to daily social drinking (Russell, Light & Gruenewald, 2004). The predictors of alcohol use have been studied extensively (Baer, 2002; Broughton & Molasso, 2006). In a somewhat unique study of 5000 students from 32 colleges, Huang, DeJong, Towvim and Schneider (2008) studied the variables associated with abstentions from alcohol. They measured the role of different factors including: alcohol use in high school, parental history of alcohol abuse, participation in extra curricular activities, respondents' own

own attitudes, and perception of others attitude, and perception of campus drinking norms as predictors of abstention. They reported that while an explicitly negative attitude towards drinking was the strongest predictor of abstaining, students simply agreeing that 'getting drunk was a bad idea' did not intend to abstain from alcohol. The authors also found that being male, having a parent who abstained, working, participating in group activities, and abstaining from other drugs including tobacco were all significantly associated with alcohol abstinence.

In the literature, motives for excessive alcohol consumption can be grouped into categories of social, personal, contextual, and environmental. A review of college student and alcohol literature by Dowdell and Wechsler (2002) groups the motives and associations for drinking into pre-college (race), college (high-risk behavior), public policy (local laws), school environment (college type, small residences – vs non residential or large dorms), alcohol environment (price and availability), and social institutional structures (neighborhood).

Several studies have demonstrated that at least some of the variability within the college population is based on demographic differences of gender, race, and college level variations, such as the year of study (Baer 2002). For instance, being male and white has been consistently associated with significant and positive relationships to drinking more alcohol. Women as a rule have reported fewer drinking problems than men. This is also because women are more at risk of sexual violence (Gross & Bellingham, 1998) after consuming alcohol and have reported fewer reasons of wanting "to feel high" (Nolen –Hoeksema, 2004). Compared to men, they report drinking more to cope with anxiety or depression (Harrel & Karim, 2008). Exposure and experience of high school drinking, at-risk behavior, and living in Greek houses are some other predictors of alcohol use.

The interactions between some of these factors make it difficult to identify the process and mediator effects of the risk enhancers upon each other. For instance, campus residence is affected by the adherence to perceived group norms in alcohol consumption related behavior (Boekeloo, Bush & Novik, 2009). However, residence itself can be a function of where, and with whom, and how many, and in what relationship, college students share their residence (Ward & Gryczynski, 2009). Similarly, adherence to popular social norms is a function of means of diffusion, as well as variance and homogeneity of perceptions regarding social norms of alcohol consumption.

On a contextual level, alcohol expectancies is probably the most well researched variable in alcohol research with college populations, particularly their role in predicting alcohol related problems (Brown, 1985). Contextual factors are more proximal as compared to environmental factors. For instance, a campus culture includes the commonly perceived drinking norms of its typical student population. Institutions known as “party schools”, for example--schools with a drinking culture--have a higher level of alcohol consumption, whereas a religious institution has a lower level of student drinking (Presley et al., 2002).

The primary variables in our study are positive and negative consequences of drinking. Negative consequences scales have been used in studies to identify students at risk of alcohol abuse and describe negative outcomes of drinking such as getting a hangover, missing classes, and being in an accident (Schaus et al., 2009). This literature describes the patterns in consequences of drinking, such as by gender - women are at an increased risk of sexual violence and coercion and men are more likely to become perpetrators of such violence (Perkins, 2002). In Perkins’ (2002) study of a non-college population, the effect of different frequencies of drinking and quantity of drinking were assessed on recall of positive and negative consequences. They found that women reported most positive consequences at a frequency of 3-5 drinks while men did the same at 5-7 drinks. The negative consequences were higher with 5-7 drinks on average for women and 8-12 drinks for men. At an individual level, the most risk for negative outcomes was for a high dosage of alcohol but the prevalence of medium high drinking made it a more significant risk for the population as a whole. A significant finding was that positive consequences did not appear to increase after a certain frequency of drinking was reached. In another study of US college students by Gruenewald et al. (2003), 2 drinks per day had a high prevalence and it was significantly associated with negative consequences. Earlier studies (Single, 1996) reported that higher episodes of binge drinking were related to consequences that are more adverse.

Recent studies of negative consequences as a predictor in college alcohol use suggest that both positive expectancies and negative consequences interact together in different ways. In one such study (Thompson et al., 2009), the role of negative consequences upon women’s drinking motivations was examined. The authors administered the Rutgers Alcohol Problem Index and the Comprehensive Effects of Alcohol Measure to 70% of the residents from two dorms. They examined the link between expectancies and

consequences. The study reported that positive expectancies were correlated with negative consequences for both men and women. For men alone, a higher level of positive expectancies - sexual expectancies and tension- reduction expectancies - were positively correlated with negative consequences. Mallets et al. (2006) reported that students anticipated that they would have to drink a larger number of drinks in order to experience consequences similar to those of previous times. Mallets et al. (2006) also report that college students who have experienced negative consequences, such as DWI, vomiting or hangovers are at an increased risk of experiencing these again.

Other works suggest that negative consequences alone play only a limited role in moderating alcohol use, and that experienced consequences have been found to be associated with only short-term change in intent to use alcohol. In a study using a weekly telephone interview over a 10- week period with 176 first year students, it was found that students with higher numbers of positive and negative consequences were likely to drink more (Patrick & Maggs, 2008). These students reported a lack of concern with avoiding the negative consequences.

The positive consequences seem to influence cognition of negative consequences (Erblich, Earleywine & Erblich, 2001). Negative and positive consequences have both been found to be significantly associated with alcohol use as well as abstinence (Park, 2004). There appears to be a correlation between negative and positive consequences that confounds their relationship with alcohol consumption. Patrick and Maggs (2008) reported that students experience both positive and negative outcomes and both these experiences were influential in alcohol related behavior. Their study also found gender differences in positive and negative consequences, with men being more influenced by positive and women by negative consequences.

In contrast to discussions of consequences of drinking, the opinion of college students on binge drinking, or perceived peer norms of college level drinking have been often used as predictor variables in alcohol drinking. Heavy episodic drinking or binge drinking is a common occurrence in colleges. Students who utilize moral reasoning are less likely to drink or support drinking by others (Haemmerlie, Montgomery & Cowell, 1999). The attitude to drinking alcohol has been examined in the context of individual and social bonding i.e. the attachment to primary (family) or secondary culture (college fraternity or sorority). Attachment also determines the

college students' selection of activities for time commitment, e.g. studying versus socializing and drinking (Leppel, 2006). Application of this theory implies that students who are married and have children are less likely to be attached to secondary culture and therefore less likely to be a part of drinking culture, whereas students living in Greek houses are more likely to be attached to secondary cultures and therefore more likely to drink as part of the college culture. Thus in this context, peer group opinion on drinking is a distal variable.

Jamison and Myers (2008) studied peer influence through the application of the theory of planned behavior to examine binge drinking. They proposed that peer pressure is more than simply perceived norms but also applies to the proximal factors of drinking behavior, such as drinking in groups with friends. They found that friends' drinking behavior significantly predicted binge drinking, as did subjective norms.

The formation of opinion on binge drinking is also an example of indirect motivations for drinking in this population i.e. – perceived peer social acceptance. In a sample (Bondy, 1996) of students identified with alcohol drinking problems and a comparative sample of students in a psychology class, it was found that women reported “social camaraderie” as a motivation for drinking across the board, even though men reported a stronger association with heavy episodic drinking and total number of drinks consumed. The study also reports that the negative consequences from drinking were equitable for individuals that identified social camaraderie, coping, and mood enhancement as motivations for drinking.

The present study primarily examines the role of positive and negative consequences as proximal variables that influence drinking in college students. The study also examines peer group opinion as a distal factor that influences drinking and drinking patterns and controls for the influence of additional demographic variables.

### **Methods**

This study was based on secondary analysis of data from the CORE Alcohol and Drug survey (Long form; Core Institute, 2009) collected from students at a Catholic University in a mid-western city during February of 2006 and 2007. The survey, which was developed specifically to assess the alcohol and drug related behavior of college students, has 39 questions (Core Institute, 2009). Questions ask about drug and alcohol use in the past 30 days, year and lifetime, as well as perceived drug and alcohol activity among

other students, the consequences of alcohol or drug use, including violence, leadership activities and demographic characteristics of students. The CORE survey instrument has been found to have both content and construct validity, as well as good test-re-test reliability (Presley, Cheng & Pimentel, 2004; Presley, Meilman & Cashin, 1996).

### **Sample**

The University at which this study took place selected students to complete the CORE survey from the entire undergraduate population utilizing a stratified random sampling approach with stratification based on class standing, race/ethnicity, and gender, proportionate to their representation in the university population. Emails were sent to all selected students. The emails were sent to invite students to complete the survey in February of each year. A second email was sent to remind students to complete the survey. As an incentive, students were told that if they completed the survey, their names would be put in a lottery pool for a surprise gift.

The survey was posted online at a university web site and the students were given an access code to enter the site and complete the survey. Of a total of three to four thousand students that were emailed each year, approximately, 1142 students completed the survey in 2006 and 1246 completed it in 2007.

Preliminary analysis on a year-by-year basis of data from 2006 and 2007 indicated that students were quite similar with reference to key demographic characteristics. The variables examined for testing sample homogeneity included housing choices, academic performance as measured by their reported GPAs, alcohol and drug use, perceptions of campus alcohol and drug use, consequences of substance use, leadership activities and volunteer efforts. Given the similarity in the data for 2006 and 2007, we decided to combine these years in order to increase our sample size and ensure that we had a sufficient number of cases in the final study sample. We could not be sure however, if some of those who took the survey in 2006 were also included in 2007. Consequently, we included only seniors from the 2006 survey sample because they would have graduated by 2007 (N=236). This reduced the possibility of duplication. We included all students who took the survey in 2007 (N=1246). Thus our initial total sample was 1482 and of this total, 416 or 28.3% were freshman, 310 (21.1%) were sophomores, 272 (18.5%) were juniors and 473 (32.1%) were seniors. Roughly three quarters (76.1%, N=1471) self-identified as White, Non-Hispanic and 72.5%



(N=1474) were female. The average age of the initial sample was 20.4 (N=1475). While age ranged from 18 to 47, 92% of the students in the sample were between the ages 18 and 22, which is the age of most traditional students. Age data were comparable to the larger university population. Similarly, in 2008, 71.5% of the undergraduate population self-identified as White and Non-Hispanic. Finally, we eliminated all individuals who had missing values on any of the variables under study so that the final sample included in all subsequent analyses was 890. Differences and similarities between this group and the original group of 1482 are discussed below.

### **Variables**

The variables used in the study are listed and described below. The primary variables in the study were negative and positive consequences scale items and responses to a question about approval or disapproval of binge drinking.

#### ***Consequences and Positive Expectancies of Drinking***

Two sets of variables were used to capture the consequences of drinking, one focusing on negative outcomes and a second one looking at the perceived positive effects of alcohol use. To capture negative consequences, we created a scale from a series of 19 items that asked about how often the individual had experienced these negative outcomes based on his or her drinking or drug use in the past year. The events reflected negative consequences of drinking of varying severity “had a hangover” to “have been taken advantage of sexually” “have taken advantage of another sexually” or “seriously tried to commit suicide.” Individuals rated each item on a scale from 0 = “never” to 5= “10 or more times.” A summary score, across all 19 items was obtained for each individual, reflecting the intensity of negative consequences he or she experienced in the past year as a result of substance use. Higher scores reflected higher numbers of negative consequences. This scale reported an alpha reliability score of .87. The positive expectancies scale comprised 14 items that reflected positive expectations associated with consumption of alcohol, including “breaking the ice,” “enhancing social activity,” “making it easier to deal with stress,” “allowing people to have more fun,” “making men sexier,” “making women sexier,” and “making me sexier.” Respondents were asked to rate each item as yes or no. To derive a final score on the scale, we summed all positive items, so that higher scores reflected higher endorsement of the positive effects of

alcohol. The alpha score found for the scale was .88 which suggests the scale has good internal consistency.

### ***Perceptions of Peers***

We created a variable to assess how the respondent believed his close friends would feel if they found out he or she was consuming five or more drinks in one sitting or binge drinking. Individuals who said that their friends would not disapprove were compared to those who said that their friends would disapprove or strongly disapprove. Second, a variable looking at the extent to which individuals believed their peers used alcohol more often than once a year, versus once a year or less was included to assess perceptions of alcohol use specifically among peers. A third variable addressed perceptions of how often the respondent believed his or her peers used more serious substances such as cocaine, opiates, steroids and other illegal drugs. Respondents who believed their peers engaged in any use of such drugs even if only once per year, were compared to those who did not believe students used any of these substances. Tobacco, alcohol and marijuana were excluded from the list of substances. Finally, we created a scale based on the answer to a question about how much the respondent thought students on the campus cared about nine different problems. These included alcohol and other drug use, campus vandalism, sexual assault, non-sexual assault, and harassment based on gender, sexual orientation, race and religion. Students could rate the extent to which they thought other students cared about these problems on a scale from 0="not at all" to 3="very much." Responses across items were then summed to derive a total "caring about campus culture" score, with higher scores reflecting greater perceptions of caring. The alpha score for this scale was also .89, again indicating that the internal consistency of the items on the scale was strong.

In addition to these sets of variables, which were our central independent variables, we included several other groups of variables because they were important controls and/or suggested by the literature as being key factors in drinking behavior.

### ***Demographic Variables***

For the present analysis, we included the following demographic variables from the CORE survey: gender, age, standing in the undergraduate program (freshman, sophomore, junior, senior), and race/ethnicity, re-coded into two groups: Student who identified as White versus those who

identified as being members of other racial and ethnic groups. We grouped all respondents who did not identify themselves as being White into one category because there were so few individuals who identified as being in other racial and ethnic groups.

### **Living and Working Arrangements**

In order to determine if living in a campus residence was associated with greater alcohol use, responses to a question about current living arrangements were re-coded. The response were combined into all those who lived in some type of campus housing (residence hall, approved housing or fraternity/sorority) versus those living in a their own house or apartment.<sup>4</sup> We also controlled for whether or not individuals lived in an alcohol or drug-free residence. In addition, we included the variable of working full or part time versus not at all.

### **Leadership and School Achievement**

Variables of student academic achievement and social involvement were included in the study. These included reported grade point average at the time of the study, recoded into a dichotomous variable of a cumulative GPA of A- or higher versus a cumulative GPA less than A-. We also created two variables from questions about involvement in campus activities. The CORE asks about 9 different activities, which include intercollegiate athletics, intramural or club sports, fraternities and sororities, religious and interfaith groups, international and language groups, minority and ethnic organizations, political and social action groups, music and other performing arts groups and student newspaper, radio, and TV. Individuals are asked to rate their involvement from not involved to leadership positions. From this question, we created two variables. The first variable is a sum of the total number of activities in which students were involved, minimally

4. We note that 17 of those who reported that they lived in a house or apartment reported also living on campus while 3 individuals who said they lived in residences reported also living off campus. Because we did not know if the error was related to the on/off campus question, or the question about residence, we did not change the responses. Some apartment buildings are quite near campus and might actually qualify as being on campus property. It is also possible that some of those in residences were in housing that was not officially recognized as being on campus such as fraternity or sorority housing.

or as leaders. To identify students who took leadership roles, we created a second variable, combining all activities and re-coding it to reflect anyone with any leadership activity in any of the 9 organizations versus no leadership roles at all. Lastly, we looked at whether or not the students were involved in participating any time in volunteer activities and compared them to those who did not report any volunteer hours.

***Dependent Variable: Any Drinking in the Last 30 Days***

In this analysis, the dependent variable was whether or not the respondent had used alcohol in the last 30 days at all. This was based on his or her answer to a question that asked about use in the last month. Respondents who said they did not use alcohol any of the days were compared to those who indicated that they used alcohol 1 to 2 days or more. We used the period of the last 30 days because other questions in the survey asked about current status. If use had occurred in the past year, but current status was not the same at that time, we would have no way to correct for this.

**Analysis**

As noted above, we used listwise exclusion of cases to control for missing cases. Our final sample for the analysis of 890 individuals was similar in terms of gender, race/ethnicity and age to the initial sample of all those who had completed the survey. First, we present the bivariate results for each independent variable in relation to alcohol use in the past 30 days. Then, we present the results from a logistic regression. Variables were entered in three stages to a model predicting the likelihood that the respondent used alcohol in the past 30 days. For our analysis, we first entered demographic variables along with living arrangements, work activities and the GPA score variable as these were temporally distant from the dependent variable. Next, we entered the variables assessing leadership and volunteer activities, perceptions of peers related to drug and alcohol use, and peer perceptions of concern with campus problems, including substance abuse problems. The last model included the two positive and negative consequences variables. We did not use a stepwise approach. Rather, we entered each set of variables subsequently so that we could see the results of each addition on all variables in the model. A stepwise regression leads to erroneous testing of multiple hypotheses and increases the likelihood of committing type 1 errors (Whittingham et al., 2006).

## Findings

### *Drinking Behavior*

Table 1 depicts information on the alcohol consumption reported for the 30 days preceding the completion of the surveys by the respondents. The table reflects that almost three quarters of the sample had one or more alcoholic drinks during the period. Further analysis (not in Table) indicates that approximately 59%, (N=654) of those who did drink in the previous month, had consumed alcohol on less than 6 days out of 30; 23% had a drink between 6 and 9 days; 15.6% reported drinking on 10 to 19 of the 30 days, and 2.1% drank on 20 to 29 days. Only 1 person reported drinking on all 30 days. Also as reported in Table 1, 84.3% of the sample had an alcoholic drink in the previous year and 87% respondents from this group also had a drink in the past 30 days.

**Table 1.** *Characteristics of the Sample on Drinking Variables*

Variable	(N=890)
<b>USE OF ALCOHOL IN PAST 30 DAYS</b>	
% Who Had 1 Drink or More in 30 Days Prior to Completing the Survey	73.5
% Who Had 1 Drink or More in the Year Prior to Completing the Survey (N=887)	84.3
Of Those Who Had A Drink in the Past Year, % Who Also Had A Drink in the Past 30 Days (N=748)	87
% Of Total Who Reported Drinking Five or More Drinks in One Sitting in the Past Two Weeks (N=899)	51.1

### *Bivariate Analysis of Characteristics Associated with Alcohol Use*

Table 2 presents the bivariate analysis of the key independent variables in the study in relation to alcohol use in the past 30 days. The data indicate that year in school was related to alcohol use. Significant differences existed among freshman,  $\chi^2 (1, N=890) = 40.79, p < .0001$ , reflecting that a significantly smaller proportion of freshman were among those who had consumed at least one drink in the previous 30 days as compared to those who had not been drinking. Conversely, among both juniors  $\chi^2 (1, N=890) = 3.90, p < .05$ , and seniors,  $\chi^2 (1, N=890) = 18.77, p < .0001$ , significantly greater proportions were among those who had been drinking in the previous month compared to those who had not. Slightly more sophomores

were also in the group that had been drinking compared to those who had not, but the difference was not statistically significant.

**Table 2.** *Bivariate Analysis of Key Variables in Relation to Whether or Not an Individual Has Had at Least One Alcoholic Drink in the Past 30 Days*

Variable	Has Not Had a Drink in Past 30 Days (N=236)	Has Had at Least One Drink in Past 30 Days (N=654)	Total % of Sample/Mean for Group (N=890)
<b>YEAR IN SCHOOL</b>			
% Freshman	54.7	31.2 ***	37.4
% Sophomores	22.0	26.5	25.3
% Juniors	11.2	16.5 *	14.9
% Seniors	12.3	26.0 ***	22.4
<b>AGE ***</b>			
Average Age (sd).	19.4 (1.52)	20.0 *** (1.72)	19.9 (1.70)
<b>GENDER</b>			
% Female	74.1	70.8	71.7
% Male	25.9	29.2	28.3
<b>RACE/ETHNICITY ***</b>			
% White Non-Hispanic	41.9	82.9 ***	76.3 ***
% Other Races and Ethnicities	58.1	17.1	23.7
<b>RESIDENCE</b>			
% Living in a College Residence of Some Type	71.2	67.0	68.1
% Living in Their Own or Their Parents' Homes or Apartments	28.8	33.0	31.9
% Living in an Alcohol Free Residence	47.5	42.8	44.0
<b>GRADE POINT AVERAGE</b>			
% With GPA of A- or Above	49.1	43.0	44.6
<b>WORK STATUS</b>			
% Working Full or Part-Time	43.2	50.1	48.3
<b>LEADERSHIP AND VOLUNTEER EXPERIENCE</b>			
Average No. of Activities Individuals Took Part In (whether as	6.95	6.93	6.93

leader or not) (s.d.)	(1.64)	(1.72)	(1.62)
% With Any Leadership Roles in School Activities/Clubs/Organizations	16.5	19.9	19.0
% Who Volunteered at Least One Hour per Month or More	57.2	54.9	55.5
<b>BELIEFS ABOUT PEERS VIEW OF THEIR BINGE DRINKING</b>			
% Who Believe That Peers Would Disapprove of Their Binge Drinking	81.4	41.6 ***	52.1
<b>PERCEPTIONS OF STUDENTS ON CAMPUS</b>			
% Who Believe Students on Campus Use Alcohol more than Once Per Year	94.9	99.8 ***	98.5
% Who Believe Students on the Campus Ever Use Drugs (Excluding Marijuana, Alcohol and Tobacco)	70.8	71.9	71.6
Average Score on Scale of How Much Students Care About Selected Problems on Campus (s.d.)	15.6 (5.56)	16.3 (5.37)	16.1 (5.43)
<b>NEGATIVE CONSEQUENCES OF DRINKING SCALE</b>			
Average Score (s.d.)	1.39 (4.01)	11.71 *** (10.64)	8.97 (10.40)
Median Score	0.0	9.0	5.0
% At or above Sample Median	8.5	70.8 ***	54.3
<b>POSITIVE EFFECTS OF DRINKING SCALE</b>			
Average Score (s.d.)	4.54 (3.87)	8.05 *** (3.47)	7.12 (3.90)
Median Score	4.0	8.0	8.0
% At or above Sample Median	27.1	59.2 ***	50.7

\* For differences between groups,  $p < .05$ .

\*\*\* For differences between groups,  $p < .0001$

Reflective of differences related to year in school, age was also significantly related to whether or not an individual had consumed any alcohol in the previous month. Those who had been drinking were slightly older, on average ( $M=20$  years),  $t(465) = -5.62, p < .0001$  compared to those who had not ( $M=19.4$  years).

Similar proportions of males and females were among those who had and had not consumed alcohol in the previous month. However, students who self-identified as White were significantly more likely to be among those who had consumed alcohol in the previous month while those who self-identified as being other races and ethnicities were much less likely to have been in the drinking group  $\chi^2(1, N=890) = 59.08, p < .0001$ . There was little differences between the students in the group that had been drinking versus the group that had not, as related to type of residence, grade point average, work, involvement in campus activities, leadership roles and volunteer experience, and none of the existing differences were found to be statistically significant.

Students who believed that their peers would disapprove of their binge drinking were significantly less likely to be among those who had consumed alcohol in the previous month  $\chi^2(1, N=890) = 109.89, p < .0001$ . Similarly, those who had consumed alcohol in the previous 30 days were significantly more likely than those who had not to think that their peers had also had a drink more than just once in the previous year,  $\chi^2(1, N=890) = 29.30, p < .0001$ . In fact, although large proportions of individuals in both groups thought this was true, almost all of those who had recently had a drink believed this to be the case. The other variable of peer beliefs about whether students on campus used drugs was not associated with alcohol use in the previous month. Variables on the Caring about Campus Culture were also not significantly associated with drinking habits in the last 30 days. As seen in Table 2, there were significant differences between the two groups on the scores on the negative consequences and positive effects scales. Specifically, individuals who had consumed at least one drink in the thirty days prior to the interview experienced a greater number of negative consequences on average ( $M=11.71$ ) compared to those who did not use alcohol in the previous month ( $M=1.39$ ),  $t(886) = -20.99, p < .0001$ . They also endorsed a greater number of positive effects of alcohol use on average ( $M=8.05$ ) compared to those who had not used alcohol ( $M=7.12$ ),  $t(380) = -12.29, p < .0001$ .

Because of the relatively large standard deviations for both these scales, we also used the sample median on each scale as a cutoff point and looked at the percent who scored below the median versus at or above it for each group on both scales. The results here also indicate that those who had at least one drink the past 30 days were significantly more likely to score above the median on the negative consequences scale,  $(1, N=890) = 271.39,$



$p < .0001$ , as well as on the positive effects of drinking scale  $\chi^2 (1, N=890) = 71.29, p < .0001$ .

### **Logistic Regression**

Table 3 (see pp 102-104) presents the results of the logistic regression. Several variables were removed from the final model following the bivariate analysis. These variables included age, as age was highly correlated to class standing. We also divided the sample by freshman versus any other year to assess the role of year of undergraduate in drinking. The bivariate analysis indicated that freshman were least likely to have engaged in drinking activity in the month prior to the survey.<sup>5</sup> Third, we used only the leadership variable in looking at campus involvement since the groups were similarly related to the average number of activities and leadership is the more critical theoretical variable.<sup>6</sup> We used the categorical measures for each variable of negative consequences and positive expectancies scales i.e. whether or not an individual was below / at/ above the sample median. This corrected the problem of outliers in the distribution of scores for both scales.

Three models were tested. The first model included demographic and personal circumstances; the second model included additional variables related to campus involvement and peer perceptions; the final model included the negative consequences and positive expectancies measures. The results for the first model indicated that the intercept and covariates were statistically significant compared to the intercept only model. In this model, being a freshman versus another year in the program, race/ethnicity, and GPA were all significantly related to the likelihood of having used alcohol in the past 30 days. Students who identified as being White were about 4.3 times more likely to report using alcohol than students who did not identify as White. Freshmen were about 75% less likely to report that they

5. We also ran the same three models using standing as a senior versus all other ranks. The results were the same in terms of the variables which attained statistical significance in each model. Senior status was also significantly associated with a greater likelihood of alcohol consumption in the 30 days prior to the interview
6. We also ran the same models substituting the total number of activities variable for the leadership variable. The results were the same in terms of variables which attained statistical significance in each model. Total number of activities in which the respondent participated did not attain significance in any models.

had used alcohol compared to students in other class years. Those students with grade point averages of A- or higher were about one third less likely to report use than those with cumulative GPAs of B + or lower. The variables of gender, residence, work activities, and living in an alcohol free residence were not significant in the model. The Tau-a statistic for this model was .164, indicating a somewhat weak relationship between the independent and dependent variables.

The second model was a better fit for the data and was statistically significant (see model fit indices). The data indicate that two of the new variables that were introduced in this model - perceptions about approval or disapproval of binge drinking activities, and perceptions of alcohol use among peers were significant. Those who believed that their friends disapproved of their binge drinking were about 80% less likely to have engaged in drinking activities. On the other hand, those who believed that their peers used alcohol more than once per year were 17.5 times more likely to have engaged in alcohol use in the past 30 days. None of the other variables entered in this model, including perceptions of other substance use, apart from alcohol, tobacco or marijuana, or perceptions of student caring were statistically significant, but the class rank, race/ethnicity and grade point average variables remained statistically significant. Again, freshman were about 70% less likely to drink than those of other class ranks, students who identified as White were 3.5 times more likely to have had a drink than students who identified as being in other racial/ethnic groups and those with GPAs of A- or higher were about one third less likely to have had a drink in the previous 30 days. The Tau-a statistic for this model shows a slightly stronger association between variables at .235.

The final model added in the negative consequences and positive expectancies scale variables, comparing the likelihood of drinking for those who scored below the sample median on both scales to those who scored at or above this cutoff. Once more, the addition of these final two variables improved the overall chi-square for the model substantially (increasing from 222.27 to 414.36). The results indicate that both the positive and negative effects variables were statistically significant in the model. For both variables, higher scores seem to be related to greater likelihood of drinking. The negative consequences scale in particular is strongly associated with a greater likelihood of drinking. The respondents who scored at or above the median on that scale were 16 times more likely to have had a drink in the previous 30 days as compared to those who scored below the sample

**Table 3.** Logistic Regression Predicting the Likelihood of Alcohol Use in Past 30 Days

Variable	Model 1				Model 2				Model 3			
	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr > Chi-Square	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr > Chi-Square	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr > Chi-Square
Intercept			32.9855	<.0001			2.2455	0.1340			0.2394	0.6246
Freshman (1) Versus Soph., Jr. or Sr. (0)	0.195 - 0.418	0.285	41.3168	<.0001	0.204 - 0.464	0.308	31.7439	<.0001	0.169	0.272	28.9325	<.0001
Male (1) Versus Female (2)	0.589 - 1.218	0.847	0.8003	0.3710	0.752 - 1.670	1.121	0.3136	0.5755	0.840 - 2.116	1.333	1.4846	0.2230
White (1) Versus Other Races/Ethnicities (0)	3.039 - 6.230	4.351	64.4762	<.0001	2.387 - 5.215	3.528	39.9798	<.0001	1.992 - 5.025	3.164	23.8177	<.0001
Live in a Campus Residence (1) Versus Apartment or House off Campus (0)	0.800 - 1.810	1.203	0.7902	0.3741	0.780 - 1.863	1.206	0.7101	0.3994	0.886 - 2.438	1.470	2.2252	0.1358
Working full or part-time (1) Versus Not Working (0)	0.858 - 1.651	1.190	1.0844	0.2977	0.932 - 1.892	1.328	2.4651	0.1164	0.756 - 1.709	1.136	0.3769	0.5392
Cumulative Grade Point of A- or Higher (1) Versus Less Than A- (0)	0.466 - 0.898	0.647	6.7968	0.0091	0.443 - 0.905	0.633	6.3040	0.0120	0.496 - 1.125	0.747	1.9458	0.1630
Live in Alcohol/Drug Free Residence (1) Versus Not (0)	0.920 - 1.881	1.315	2.2563	0.1331	0.953 - 2.037	1.393	2.9351	0.0867	0.868 - 2.064	1.338	1.7354	0.1877
Perceive that Individuals Disapprove of Their Binge Drinking (1) Versus Do Not Disapprove (0)	-----	-----	-----	-----	0.117 - 0.259	0.174	75.2223	<.0001	0.222 - 0.549	0.349	20.7982	<.0001

**Table 3.** Logistic Regression Predicting the Likelihood of Alcohol Use in Past 30 Days (cont'd)

Variable	Model 1				Model 2				Model 3			
	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr > Chi-Square	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr > Chi-Square	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr > Chi-Square
Any Volunteer Activity (1) Versus No Activity (0)	----	----	----	----	0.669 - 1.364	0.955	0.0648	0.7911	0.758 - 1.730	1.145	0.4148	0.5196
Have Leadership Role in Campus Organization or Activity (1) Versus Not (0)	----	----	----	----	0.764 - 2.035	1.247	0.7818	0.3766	0.755 - 2.248	1.302	0.9000	0.3428
Perceive Students on Campus as Engaging in Drug Use Beyond Marijuana, Alcohol or Smoking (1) Versus Not (0)	----	----	----	----	0.674 - 1.485	1.000	0.0000	0.9992	0.587 - 1.461	0.926	0.1080	0.7424
Perceive Students on Campus as Engaging in Use of Alcohol more than Never or Once Per Year (1) Versus Not (0)	----	----	----	----	2.096- 147.500	17.581	6.9784	0.0082	1.117 - 119.793	11.567	4.2135	0.0401
Score on Scale Measuring Extent to Which Students' Care About Various Select Problems on Campus <sup>a</sup>	----	----	----	----	0.947 - 1.006	0.976	2.3939	0.1218	0.942 - 1.013	0.977	1.5851	0.2080
At or Above Sample Median for Scale of Negative Consequences of Substance Use in Past Year (1) Versus Below Median (0)	----	----	----	----	----	----	----	----	9.437 - 27.242	16.034	105.2748	<.0001

**Table 3.** Logistic Regression Predicting the Likelihood of Alcohol Use in Past 30 Days (cont'd)

Variable	Model 1			Model 2			Model 3					
	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr >	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr >	95% Wald Confidence Limits	Odds Ratio	Chi-Square	Pr >
At or Above Median for Scale of Total Positive Beliefs about Alcohol Use (1) Versus Below Median (0)	----	----	----	----	----	----	----	----	1.325 3.109	2.029	10.5717	0.0011
- 2 Log Likelihood Intercept Only Model	1029.541				1029.54				1029.541			
- 2 Log Likelihood Intercept and Covariates Likelihood Ratio	915.780				807.272				615,180			
Df	113.7616 7				222.2695 13				414,36 15			
p > Chi-Square	< .0001				< .0001				< .0001			
Tau-a	.164				.235				.311			

<sup>a</sup> Higher scores reflect greater perception of caring.

median. A higher score on the positive expectancies scale was also associated with a greater likelihood of alcohol use; those who scored at or above the median were twice as likely to have used alcohol in the previous month compared to those who scored below this cut off. In addition to these two variables, the peer perceptions of binge drinking variable remained significant and indicated again that those who perceived that their peers would disapprove of their binge drinking were about two thirds less likely to have had a drink in the past 30 days. Similarly, the variable assessing perceptions of peer alcohol use remained significant and a strong predictor; individuals who believed that their peers used alcohol more than once in the previous year were 11.6 times more likely to have had a drink in the previous 30 days compared to those who perceived that their peers used alcohol less often.

Freshman status and the race/ethnicity variables remained significant in the final model, but the grade point average variable was no longer statistically significant. Finally, Tau-a was .311, essentially having doubled from its value in the first model and reflecting a stronger level of association between independent and dependent variables.

### **Discussion**

Before discussing the findings in more depth, it is important to point out the limitations of the data. First, these data come from a Jesuit university in the mid-west. The university is comprised of primarily of students who identify as White (about 70% in 2008) and female (about 65%). Ninety percent of the student body are traditional students and fall between 18 and 24 years of age. Second, the sample of the study was self-selected. They may have had particular experiences with drugs and alcohol, both positive and negative, that could have increased their likelihood of participating in the survey, limiting the generalizability of the findings. Third, the data are cross-sectional and represent a single point in time. However, they represent student perspectives at different points in their educational trajectories (freshman through seniors) and we control for this fact in the analysis. Further, despite the limitations of the sample, the characteristics of those responding may be typical of students at many college campuses and therefore relevant to those working with this group.

The findings presented here suggest some interesting patterns that have important implications for designing interventions on college campuses. First, the data indicate that intervention programs, at least on this campus, may be working to the extent that freshman have a lesser likelihood of

reporting that they have had an alcoholic drink in the last 30 days. This is true despite the fact that the literature suggests freshman may be more susceptible to peer pressure (Martens, Rocha, Martin & Serrao, 2008) related to drinking behaviors. They may feel more vulnerable away from home for the first time and drink to address these feelings (Becker, 2008) or they may feel a sense of freedom to drink for the first time (Borsari, Murphy & Barnett, 2007). While it is possible that this finding may be explained by variables such as peer pressure to not drink, or consequences, we note that the year in school variable remains significant even when these variables are added to the equation, suggesting it operates independent of these influences. Perhaps students coming into college are getting more helpful drug and alcohol information prior to entry as well, which may explain why freshman are less likely to be drinking.

At the same time, the bivariate analysis and logistic regression suggest that other classes are drinking, including sophomores and juniors who may still not be of legal drinking age. This suggests that interventions need to be targeted not only to incoming students, but to continuing classes as well.

Also similar to other works that look at differences by race and ethnicity (Baer, 2002; Kuntsche, Knibbe, Gmel & Engels, 2006; Presley et al., 2002), we found that students who identified as White had a greater likelihood of having had an alcoholic drink in the past 30 days. The literature suggests that this may be an outcome of the interaction between race and ethnicity variables with SES factors (Gilman et al., 2008). A likely inference might be that students who identify as White have more money to spend on things such as alcohol and have more cultural acceptability for drinking alcohol. Further analysis, looking specifically at students who did not identify as White within each of their racial and ethnic groups indicates that the proportion of African American and Hispanic/Latino American identified students who do drink are somewhat greater than the proportion who do not while among individuals who identified as Asian, both Asian American and Asian foreign born, and those who identified as American Indian, the opposite was true. However, students who identified as White, still had a greater proportion of drinking individuals compared to students who identified as members of all other racial and ethnic groups. A possible explanation might be that students from other ethnicities and races face many obstacles in order to attend college (Peralta & Steele, 2009). Therefore, they may take their experience more seriously and be more reluctant to jeopardize their success by engaging in activities such as drinking which

may hurt their academic performance.

The role of academic performance itself is interesting to note. In the first and second models, it appears as if those who have A's are less likely to report alcohol use. However, once we added in the consequences and expectancies variables, grade point average did not matter any more. Further analysis, looking at the relationship between the scale of negative outcomes that might result from drinking and grade point average shows that those who had A's had fewer negative events occur ( $M=7.91$ ,  $N=397$ ) compared to those who had other grade point averages ( $M=9.82$ ,  $N=493$ ;  $T=2.78$ ,  $df=879$ ,  $p < .01$ ). Thus, grades appear to matter in that they apparently buffer the individual from experiencing the negative effects of drinking. It is also possible, of course, that individuals with good grades don't drink and are therefore less likely to experience negative outcomes, but if this were the case, it seems that GPA would matter in the equation and negative outcomes would not. This is in keeping with other studies exploring the link between GPA and alcohol problems (Paschall & Freisthler, 2003). At the same time, there is no relationship between opinions about binge drinking, and GPA. In previous studies some relationship has been reported between lower GPA and increased influence of peer group opinions on drinking (Hamid, 1995).

Leadership or volunteer experiences were not found to relate to drinking in the last month. This variable has been found to have confounding results in previous studies as well. For instance, leaders within Greek organizations and sororities are more at risk of alcohol abuse. In an interesting study by Spratt and Turrentine (2001), of a sample of 2000 students drawn from the National Core data archive, the respondents with more than one leadership position in religious and minority organizations were found to be 3 times more likely to abuse alcohol, which was more than those with leadership position in high risk groups, such as Greek organizations. Leaders with a single leadership position were likely to drink less than their low risk group members in the religious and minority organizations. Proximity to a form of leader group culture has been offered as a possible explanation for these findings. Also, in contrast to other findings, we did not find a relationship between residence and drinking activity. It is possible that residence does not matter once other variables are controlled, but we also found no relationship between drinking and residence in the bivariate analysis. It is possible that sorority and fraternity residence is also the issue here, but we did not have the data to pull this factor out and look at it more



closely in this analysis.

Perhaps one of the most interesting findings here is that the greater the number of negative outcomes one has experienced in the past year related to drinking or drug use, the more likely one is to have had an alcoholic drink in the past 30 days. This suggests, consistent with the literature previously cited, that negative effects do not necessarily deter drinking. This finding is perhaps further substantiated by additional analysis utilizing only those who had a drink in the past year (N=748). If negative consequences are a deterrent, then we might expect those who had been drinking in the past year but not in the past 30 days to have experienced more negative consequences than those who had been drinking both during the past year and past 30 days. This, however, is not the case. The data indicate that among those who had a drink in the past year, individuals who did **not** drink in the past 30 days (N=97) had an average rating for negative consequences of 2.82. In contrast among those who had a drink in the past year and past 30 days (N=651), the average number of negative consequences was 11.7. Differences between the groups were statistically significant at  $p < .0001$ . Additionally, using the median cutoff point for negative consequences, 71% of the 651 individuals who drank in the past year and past 30 days were at or above the cutoff in comparison to 16.5% of those who had a drink in the past year but not in the past 30 days (N=97). Again, this difference was statistically significant.

On the other hand, these data also suggest, as do other works previously noted, that positive expectancies may counter negative consequences. Among those who had been drinking in the past year but not in the past 30 days, positive expectancies were also lower, averaging 5.6 compared to 8.07 among those still drinking. Thirty-eight percent of those who had been drinking in the past year but not in the past 30 days were at or above the median cut off for positive expectancies compared to 59.5% of those who were currently drinking. Again, all differences between groups on these variables were statistically significant. Ultimately, then, those who drank in the past year and past 30 days had more positive and negative consequences than those who drank in past year but not the past 30 days. This suggests that it was not the great number of negative consequences that led those who did stop drinking to stop, but it may have been the lower number of positive expectancies!

We can also hypothesize that negative consequences are a result of recent drinking but positive beliefs and expectancies about alcohol outweigh

them as a consideration in making the decision to drink.

The variable on importance of binge drinking beliefs as well as the variable assessing perceptions of peer use of alcohol suggest that peer pressure does matter. Peer influence in drinking is important at both initiating and maintaining alcohol drinking practice in college population (Wood, Read, Palfai & Stevenson, 2001). Borsari and Carey (2001; 2006) conducted a review of the role of peer relationships and their established pathways of influencing alcohol behavior. Describing disapproval of peers as a factor in keeping with the Social Learning Theory framework, Borsari and Carey argue that peer influence works through cognitive, environmental, and modeling that deters alcohol consumption. In a study of 818 first year undergraduate students, the researchers examined a) descriptive social norms – perception of alcohol consumption amongst peer group and b) perceived injunctive norms - perceived peer approval and disapproval (Neighbors, Lee, Lewis, Fossos & Larimer, 2007). The authors measured perceived drinking norms through 4 items that assessed the frequency and intensity of drinking. Social norms, both descriptive and injunctive predicted the largest amount of weekly alcohol consumption. Studies have reported that different aspects of peer and friend relationships influence alcohol decision-making. In a study of individuals abstaining from alcohol in college, Huang et al. (2009) found that perception of friends' attitude was an important factor, along with having another friend who abstained.

### **Implications**

Literature in substance abuse intervention has more recently been divided between those who posit that college students drinking activity relates to planned behaviors versus those who emphasize contextual influences. This study provides more support for the contextual school. While it could be argued that the importance of positive consequences suggests a planned approach to drinking, the fact that the students in this study did not seem to weigh negative consequences in the same manner suggests that their behavior is less planned and more contextual. Further, the role of peer pressure related to binge drinking and peer perceptions of drinking suggests the importance of the college environment as both a deterrent as well as an enhancement of drinking behaviors. It could also be argued that the finding that freshman are less likely to drink reflects their lack of experience and identification with the college context. In other words, they have not yet learned how to behave in college settings vis-à-vis drinking.

The good news we can take from this is that colleges need to focus more heavily on providing a context that does not support drinking behavior. As noted, students in upper classes need to be targeted as much as those first entering. Indeed, interventions may need to consider that contexts may vary for students in different phases of their academic careers and be designed accordingly. It is likely that access to alcohol and social activities that promote alcohol use are quite different when students are younger and/or first enter school versus when they are of legal drinking age. There is also evidence that parental intervention before students begin college enhances further college intervention programs (Turrisi et al, 2009). This suggests that college may want to initiate efforts to address expectations about drinking behavior prior to the time newly admitted students begin their college programs, reaching out to and involving parents in interventions.

While this study did not find differences related to residence in alcohol free housing and drinking behavior, the centrality of context also suggests that opportunities to engage in social activities where alcohol use is not the norm are important intervention. Students also need direction to learn from negative experiences with substances and alter their behavior. This ties in with programmatic interventions that have begun to look at training in mindfulness techniques as a way to combat substance abuse (Leigh & Neighbors, 2009).

Further research also needs to examine how soon after coming to college freshman start to identify with the university context and the factors that lead to that identification and alcohol drinking/substance abuse overlap. In addition, a better understanding of how positive consequences can be provided to students without the use of substances would help us to tailor interventions more precisely and effectively.

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