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Identifying Factors that Increase the Likelihood of Driving After Drinking among College Students

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Abstract

Driving after drinking (DAD) is a serious public health concern found to be more common among college students than those of other age groups or same-aged non-college peers. The current study examined potential predictors of DAD among a dual-site sample of 3,753 (65% female, 58% Caucasian) college students. Results showed that 19.1% of respondents had driven after 3 or more drinks and 8.6% had driven after 5 or more drinks in the past three months. A logistic regression model showed that male status, fraternity or sorority affiliation, family history of alcohol abuse, medium or heavy drinking (as compared to light drinking), more approving self-attitudes towards DAD, and alcohol expectancies for sexual enhancement and risk/aggression, were independently associated with driving after drinking over and above covariates. These results extend the current understanding of this high risk drinking behavior in collegiate populations and provide implications for preventive strategies. Findings indicate that in addition to targeting at-risk subgroups, valuable directions for DAD-related interventions may include focusing on lowering both self-approval of DAD and alcohol-related expectancies, particularly those associated with risk/aggression and sexuality.

Keywords

alcohol; driving; drinking; injunctive norms; expectancies

1. Introduction

Driving after drinking (DAD) among college students is a serious national health concern. For example, in 2005, almost 3.4 million college students drove under the influence of alcohol, while half of all traffic fatalities among 18–24 year olds were alcohol related (Hingson, et al., 2009). With respect to past month prevalence, 41% of college student drinkers report driving after any alcohol consumption, 17% report driving after drinking five or more alcoholic beverages, and 28% report riding with an intoxicated driver (Hingson et al., 2003). College students are more likely to engage in this risky behavior than same-aged non-college peers, even when controlling for demographics and age of onset of drinking

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(Paschall, 2003). Further, DAD rates among college students increase substantially after they reach the age of 21 (Beck, et al., 2010; Fromme et al., 2010).

Several factors beyond perceived level of intoxication are associated with DAD among college students. These include judgment of overall vulnerability involving calculations about such things as distance to drive, time of day, likelihood of getting caught, weather conditions, and self-efficacy, as well as rewards associated with driving and relative costs or difficulty in obtaining alternate transportation (Fairlie et al., 2010; Greening & Stoppelbein, 2000; Kulick & Rosenberg, 2000; Thurman, 1986). Certain living arrangements such as residing in fraternity or sorority houses, in co-ed dormitories, or off-campus, as well as personality variables like sensation-seeking, also play a strong role in increased risk of DAD (Harford, et al., 2002; Wechsler et al., 2003; Zakletskaia et al., 2009). Frequency of intoxicated driving episodes is linked with higher likelihood of future DAD, decreased perception of risk associated with intoxicated driving, and higher estimations of peers' drunk driving prevalence (Agostelli & Miller, 1994; Finken et al., 1998; McCarthy et al., 2005). The current study sought to examine a variety of risk factors for DAD in a large sample of college students.

Drinking at high levels is predictive of an array of alcohol-related problems, including DAD. Past studies with both high school and college student participants indicate that heavy episodic drinkers (men who drink five or more drinks in one setting and women who drink four or more), and especially frequent heavy episodic drinkers, are at higher risk for DAD than their lighter-drinking peers (Canterbury et al., 1992; Lewis et al., 2005; Marczinski & Fillmore, 2009; Wechsler et al., 1994). Furthermore, a higher personal estimate of the number of drinks an individual can consume within an hour and still be able to drive safely and legally is predictive of driving after any drinking and driving after consuming five or more drinks within the past month (Hingson et al., 2003).

Other DAD risk factors assessed in this study include gender, fraternity or sorority affiliation, family history of alcohol problems, perceived attitudes of other students (injunctive norms) toward DAD, and alcohol expectancies. A gender difference among college students is less apparent for alcohol-related problems that are relatively private or involve harm to self, however, men are more likely than women to experience negative drinking outcomes that are public, harmful to others, and have legal ramifications (Perkins, 1992; 2002; Sugarman et al., 2009). Given this research, we anticipated that men would be at greater risk for engaging in DAD than women, similar to the findings ofBeck et al. (2010). Similarly, other studies have pointed to greater risk for DAD among males than females (Engs et al., 1996; Harford et al., 2002; McCormick & Ureda, 1995; Mindanik et al., 1996).

Students who are members of fraternities or sororities tend to consume alcohol more frequently, in larger quantities, and encounter more alcohol-related problems than students not affiliated with these organizations (Barry, 2007; Cashin et al., 1998; Danielson et al., 2001; Sher et al., 2001). While there is little research focusing specifically on DAD among fraternity or sorority affiliated college students, studies conducted byCashin et al. (1998) and Wechsler et al.(2003) have found greater prevalence of this risky behavior among students in their sample who were involved with fraternities and sororities than among those who were not. Further, family history of alcohol abuse is related to problematic drinking in college students also (Capone & Wood, 2008; LaBrie et al., 2009; LaBrie et al., 2010; Perkins & Berkowitz, 1991; Pullen, 1994). Research examining family history of alcohol abuse as a risk factor for DAD is scarce. However, one study found that 16–18 year-old adolescents who had a family history of alcohol abuse were more likely to underestimate their levels of intoxication, and consequently engage in DAD (Turrisi and Wiersman, 1999).

Students' well-documented perceptions that others drink more heavily than they actually do (perceived descriptive norms), and that others are more approving of risky drinking than they actually are (perceived injunctive norms), predict their own alcohol use (Neighbors et al., 2008). Recently, the perception of other students' approval of DAD has emerged as a significant independent predictor not only of intentions, likelihood, and frequency of DAD (Armitage et al., 2002; Gastil, 2000; Greenberg et al., 2004; McCarthy et al., 2007) but also of increased likelihood for the experience of lifetime consequences related to DAD (McCarthy et al., 2005). We sought to extend this previous injunctive norms research by exploring whether one's own approval or one's perceptions of reference groups'approval of DAD influences engaging in this behavior.

Lastly, expectations about the effects of alcohol are associated with greater levels of drinking and ensuing negative consequences (Devine & Rosenberg, 2000; Ham & Hope, 2003; Jones et al., 2001). Problem drinkers in particular, expect more immediate positive outcomes as a result of their drinking, such as those involving tension reduction, arousal, and sexual enhancement than non-problem college student drinkers (Lewis & O'Neill, 2000). Furthermore, one study focusing on adults with multiple DUI convictions linked positive alcohol expectancies to likelihood of DAD recidivism (Schell et al., 2006). We speculated that DAD would fall within the spectrum of negative drinking consequences associated with alcohol expectancies.

1.1 Aims and Hypothesis

The current study sought to examine predictors of DAD among college students. We hypothesized that male gender, race, membership in a fraternity or sorority, and a positive family history of alcohol abuse or dependence would be associated with DAD. Second, heavier drinkers would be more likely to drive after drinking than lighter drinkers. Third students with more approving attitudes towards DAD, and those who perceived higher levels of reference group approval, would be more likely to engage in the behavior. Fourth, alcohol expectancies would be differentially associated with DAD.

2. Method

2.1 Participants

Participants belonged to one medium-sized private university (enrolling approximately 6000 students), and one large public university (with an approximate enrollment of 30,000 students), located on the west coast of the United States. A randomly generated list of 3500 students was requested from the Office of the Registrar at each university, and the students on this list were invited to participate in the study. Of these, a total of 3753 completed the survey (54% recruitment rate). From these, a subsample of 3037 nonabstaining drinkers was used for the current analyses. Mean participant age was 20.01 years (SD = 1.34) and 62.2% were female. Fifty eight per cent of this sample identified themselves as Caucasian, 17.0% Asian, 13.2% Hispanic, 2.7% Black, 0.5% American Indian, and 6.9% Multiracial/Other. This nonabstaining sample consisted of 45.2% light drinkers, 48.9% moderate drinkers, and 5.9% heavy drinkers, while 24.1% of the sample reported membership in a fraternity or sorority.

2.2 Design and Procedure

In the initial weeks of the fall 2007 term, 3500 students at each of the two campuses were invited via mailed letters to participate in a study about college alcohol use and attitudes toward drinking in college. A follow-up email containing a URL to an online survey was then sent. Clicking this link directed the students to enter the unique PIN number assigned to them, following which they were presented with an IRB-approved consent form. Consenting

participants were then directed to a 20 minute survey, for which they received $20 compensation upon completion.

2.3 Measures

Participants reported age, sex, race, ethnicity, and whether they were affiliated with a fraternity or sorority. In addition, the following were assessed:

2.3.1 Driving after Drinking—The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) assessed the occurrence of 25 alcohol-related consequences over the past three months (e.g., "Not able to do your homework or study for a test"). From this questionnaire, two questions assessing driving after drinking alcohol were used for purposes of this study. Participants indicated whether in the last three-month-period they had driven shortly after consuming either 3 or more, or 5 or more drinks. Participants responded using a scale with the options of 0 (*never*), 1 (*1 to 2 times*), 2 (*3 to 5 times*), 3 (*6 to 10 times*) or 4 (*more than 10 times*).

2.3.2 Family history—Participants reported family history of alcohol use by indicating yes/no to whether any of their biological relatives "had a significant drinking problem—one that should or did lead to treatment?" This measure was previously developed and effectively used by Miller & Marlatt (1984).

2.3.3 Alcohol use—Participants' drinker type classification was measured using the inquiry, "Describe your alcohol usage." Respondents then self-categorized themselves with one of three drinker type labels: (a) light drinker, (b) moderate drinker, (c) or heavy drinker. As the purpose of the study was to examine driving after drinking, respondents who indicated never having tried alcohol or abstaining from alcoholic beverages were excluded from the study. In addition, the Daily Drinking Questionnaire (DDQ; Collins et al., 1985; Kivlahan et al., 1990) assessed average drinking frequency over the past month. Participants reported the typical number of drinks they consumed each day of the week, and responses were summed to form a total drinks per week variable used in the analysis.

2.3.4 Driving after Drinking Injunctive Norms—The Injunctive Norms Questionnaire (Baer, 1994) requires participants to estimate the extent to which they themselves and various reference groups approve or disapprove of four alcohol related scenarios on a 7-point scale (1 = *strongly disapprove* to 7 = *strongly approve*). From this scale, the question "How much do you think the following people approve of driving a car after drinking" was asked in reference to "yourself," "your closest friends," and a "typical [campus name] student." These three variables, respectively, represented the constructs of "attitudes toward driving after drinking," "injunctive norms – close friends," and injunctive norms - typical student.

2.3.5 Alcohol expectancies—Participants' expectations surrounding alcohol consumption were assessed using the expectancies questionnaire from the Comprehensive Effects of Alcohol Scale (CEOA; Fromme et al., 1993). Participants answered 38-items indicating expectations of how they anticipated acting or feeling while under the influence of alcohol (e.g., "I would enjoy sex more," "I would act sociable"), using a 4-point scale (1 = *disagree* to 4 = *agree*). The 7 expectancy subscales used were Sociability (α = .90), Tension Reduction (α = .74), Liquid Courage (α = .84), Sexuality (α = .77), Cognitive and Behavioral Impairment (α = .84), Risk and Aggression (α = .80), and Self-Perception (α = .73). Subscales were constructed by averaging its respective items.

2.4. Analytic Plan

As the driving after drinking variable possessed skewed distribution properties, respondents were binary classified as a function of whether they drove after three or more drinks (1 = yes, 0 = no). The same yes/no categorization scheme was also used for respondents who drove after five or more drinks. The race variable was recoded as Caucasian (versus non-Caucasian) because of the limited representation in proportion of racial minority groups. For the purpose of interpretation in a logistic regression model, alcohol use was binary coded to construct the two variables of medium and heavy alcohol use (with light alcohol use serving as the reference level in both variables). Analyses were first performed to examine descriptive data and the correlation matrix. Chi-square and t-test analyses were conducted to identify variables implicated in distinguishing between respondents who drove versus those who did not after consuming three or more drinks.

Next, the relative contribution of the predictors in accounting for variance in DAD were evaluated using a four-step binary logistic regression model. Serving as the primary outcome variable was whether or not respondents drove after consuming three or more drinks. The predictors estimated in each block of the model were entered as follows. The demographic characteristics of gender, race, fraternity or sorority membership, and family history were entered in Step 1. Drinker type, specifically moderate and heavy drinker (both compared to light drinker), was entered into Step 2. The predictors specified in Step 3 were attitudes toward driving after drinking and the drinking after driving norms referencing close friends and typical students. Finally in Step 4, the the seven alcohol expectancies subscales of sociability, tension reduction, liquid courage, sexuality, cognitive and behavioral impairment, risk and aggression, and self-perception were incorporated into the model.

The parameter used to determine the unique contribution of predictors in a logistic regression model is the odds ratio (OR), also interpreted as as a measure of effect size (Lipsey & Wilson, 2001). Odds ratio estimates were evaluated in the final model, after controlling for all other predictors. The null hypothesis of an odds ratio coefficient is 1.00, signifying no systematic relationship between the predictor and the outcome. The Nagelkerke R^2 was used to represent the proportion of variance contributed by each successive block of predictors, as well as the total variance explained in the final model (Norusis, 2003). Statistical significance associated with R^2 change was calculated based on the −2 log likelihood test of sequentially nested models (Field, 2009). As variance inflation factor (VIF) for all variables attained a threshold no higher than 3.5, multicollinearity problems were not encountered.

3. Results

Descriptive information disclosed that the nonabstaining sample consisted of the following drinker types: 45.2% light drinkers, 48.9% moderate drinkers, and 5.9% heavy drinkers. In terms of average drinks consumed per week, light drinkers reported 2.54 (SD = 3.23) drinks, moderate drinkers reported 9.85 (SD = 7.99) drinks, and heavy drinkers reported 25.18 (SD = 14.72) drinks, $F(2, 3014) = 1002.84$, $p < .001$. Follow-up t-test contrasts on drinks per week further statistically discriminated among all three drinker types, all $p < .001$. Respondents who drove after three or more drinks (19.1%) averaged 13.06 (SD = 11.31) drinks per week compared to the 6.05 (SD = 7.66) drinks of the rest of the sample. Further, respondents who drove after five or more drinks (8.6%) averaged 15.95 (SD = 12.73) drinks per week. The correlation matrix, presented in Table 1, shows that driving after three or more drinks and after five or more drinks both significantly correlated with each variable, except race.

3.1 Proportion and Mean Differences as a Function of Drinking and Driving Status

Differences between respodents who did and did not drive after 3 or more drinks were examined for each of the measures. Chi-square tests revealed that respondents who were male, belonged to a fraternity or sorority, possessed a family history of alcohol use, and were self-described moderate and heavy drinker types were disproportionately more likely to drive after three or more drinks (Table 2). Racial identification, however, was not found to be significantly different as a function of drinking after driving status. T-tests supported that respondents driving after three or more drinks reported higher average scores on attitudes toward drinking and driving, and perceive higher norms concerning drinking after driving for close friends and typical students, as well as report higher scores on each of the seven alcohol expectancy subscales (Table 3).

3.2 Explanatory Model

As presented in Table 4, each successive block of predictors, as well as the final binary logistic regression model was determined to be statistically significant, $X^2(df = 16) = 508.16$, $p < .001$, Nagelkerke Total $R^2 = .26$. After statistically adjusting all other predictor effects in the final model, the following risk factors uniquely contributed to driving after 3 or more drinks: male gender ($OR = 1.57$, $p < .001$), being affiliated with a fraternity or sorority ($OR = 1.41$, $p < .01$), possessing a family history of alcohol abuse ($OR = 1.50$, $p < .001$), being a moderate drinker ($OR = 3.51$, $p < .001$) or heavy drinker ($OR = 5.33$, $p < .001$), having personal attitudes more approving of driving after drinking ($OR = 2.31$, $p < .001$), and higher scores on the alcohol expectancies concerning sexuality ($OR = 1.24$, $p < .05$) and risk and aggression ($OR = 1.38$, $p < .05$). No other predictors were found to uniquely explain for variance in driving after 3 or more drinks.

4. Discussion

Findings from the current study reveal that DAD appears to be a fairly common behavior among nonabstaining college students (19.1% of the sample drove after 3 or more drinks and 8.6% drove after 5 or more drinks) despite years of efforts to curb this activity. Using logistic regression to control for common risk factors associated with driving after drinking (sex, fraternity or sorority affiliation, family history of alcohol abuse status, alcohol consumption), both personal attitudes and alcohol expectancies for sexuality and risk/aggression remained associated with DAD. Consistent with prior research, males, medium or heavier drinkers (as compared to light drinkers), and participants with stronger approval of drinking-driving were most likely to engage in DAD. Further, the current findings extend literature showing that students who belong to fraternities or sororities (compared to those who do not) and students with a family history of alcohol abuse (compared to those without) are more likely to experience alcohol misuse and alcohol-related problems by demonstrating that these at-risk groups were significantly more likely to engage in DAD over and above consumption level and other covariates. Although it is not surprising that these risk factors appear to extend to decisions to engage in DAD, these findings nonetheless indicate a need for researchers to better understand the role that the culture within fraternities and sororities, as well as family history, and attitudes play in DAD motivations and behaviors.

Although injunctive normative perceptions of close friends' and typical students' attitudes toward drinking-driving were not associated with DAD once covariates were included in the regression model, there were significant simple correlations found between self attitudes and both close friend and typical student norms ($p < .001$). The moderate and strong correlations between injunctive norms for close friends (.70) and typical students (.43) with personal attitudes, however, suggest that these normative perceptions are important in the formation and sustaining of own's one attitudes towards DAD and might be targets of preventative

interventions. Although limited research has examined the relationship between close friend drinking-driving norms and young adults' likelihood to engage in DAD (Grube and Voas, 1996; McCarthy et al., 2007), research has not yet established the salience of normative perceptions related to typical students. In the current sample, although both were significant, the simple correlations between perceived close friend norms and DAD were stronger than that for perceived typical student norms, thus suggesting that perceived attitudes of close friends more closely match one's behavior. Research leading to a better understanding of the varying influence of injunctive normative perceptions of various salient subgroups (e.g., typical students, typical same-sex students, fraternity or sorority members, athletes) on one's motivation and likelihood to engage in DAD could be valuable to future initiatives targeting injunctive norms.

Of particular interest is that despite being largely disapproving of DAD (84.4% strongly disapproved and 13% moderately or somewhat disapproved), over 19% of the sample engaged in the behavior nonetheless. A better understanding of this inconsistency is needed to develop appropriate strategies for minimizing DAD among college students. For example, alcohol myopia theory helps explain this inconsistency, by which individuals who are under the influence tend to focus on their immediate needs (e.g., getting to another party, going home, hooking up), even at the expense of health risks (e.g., fatal car accident) (MacDonald et al., 1995, 1998). Providing students with salient, inhibiting cues within drinking contexts has been shown to reduce intentions for high risk behaviors (MacDonald et al., 2000), and may be a strategy conducive to DAD prevention, perhaps through the use of peer reinforcement or social norms-based poster campaigns.

Findings revealed that each of the seven alcohol expectancies subscales was bivariately associated with both driving after 3 or more drinks and driving after 5 or more drinks. Expectancies for risk/aggression, exhibited the strongest simple correlation with DAD compared to the other types of expectancies. Finally, in the logistic regression model controlling for all of the other covariates and each of the expectancy subscales, sexual and risk/aggression expectancies remained associated with DAD. Literature demonstrating the enhanced salience of convenience or tangible rewards among intoxicated youth (Greening and Stoppelbein, 2000; McCarthy et al., 2006) suggests that students with greater positive alcohol expectancies of sexual enhancement may be less inclined to forego potential romantic opportunities, even if those opportunities come with great risk. Consistent with studies linking sensation seeking to drinking-driving (Greene et al., 2000; Jonah et al., 2001), these findings indicate that students with greater expectations of risk/aggression (e.g., taking risks, acting aggressive, feeling dominant) may be fulfilling alcohol-related expectations by engaging in the high risk behavior of DAD. These findings demonstrate that, like normative perceptions, future studies examining DAD in collegiate populations should account for students' alcohol-related expectancies, particularly positive expectancies which appear especially salient to DAD risk. Moreover, measures specific to drinking-driving expectancies, such as the Positive Expectancies for Drinking and Driving for Youth (PEDD-Y; McCarthy et al., 2006), may be beneficial to targeted prevention efforts.

By documenting that fraternity or sorority affiliated and family history positive student subgroups known to be at heightened risk for alcohol problems were also at increased risk for DAD, even after controlling for alcohol consumption, the present results emphasize the need to further explore the distinct cultural and developmental influences that may contribute to engagement in this high risk drinking behavior. For example, fraternities and sororities may be proximally embedded in social drinking cultures in which DAD is perceived as more normative than in other student culture settings, and students with past exposure to familial alcoholism may be desensitized to the risks associated with DAD. DAD was also more prevalent among males in the current sample, thereby supporting that males

are more inclined to exhibit publicly harmful behavior than females (Perkins, 1992, 2002; Sugarman et al., 2009). Future studies should therefore consider specifically examining predictors of DAD that may be most salient to males (e.g., sexual and risk/aggression expectancies, and same-sex close friend/student injunctive norms).

Limitations of the current study include its reliance on both cross-sectional data, which cannot allow us to affirm causal direction, and self-report data, which carries the risk for response bias, especially with respect to a morally-charged issue such as DAD. In addition, this study assessed if respondents had driven shortly after consuming 3 or more, or 5 or more drinks regardless of sex, weight, or period of time in which drinks were consumed and thus do not account for true BAC levels. Future research would benefit from addressing these limitations. In addition, assessing the impact of other contextual variables such as those involving access to a car, as well as perceptions of law enforcement influences would be interesting avenues for future studies to explore. Despite the limitations of this study, however, we believe the utilized measures provide for an adequate framework by which to examine influences of DAD risk. Finally, the lack of association between racial-ethnic status and DAD in the current analyses should be interpreted with caution given the relatively homogeneous sample and dichotomous operationalization of race (Caucasian vs. non-Caucasian).

4.1 Conclusions

A number of potential implications can be drawn from the present findings. First, drinking-driving based preventive initiatives targeting subgroups of students found more likely to engage in DAD (e.g., heavier drinkers, sorority or fraternity members, students with a family history of alcohol abuse) may offer a promising approach to reducing DAD among college students. Specifically, these findings point to the potential for interventions aimed at reducing one's alcohol-related expectancies and perceptions of proximal others' attitudes toward DAD to reduce students' motivations to engage in this dangerous behavior. For example, social norms interventions, which have been effective in correcting injunctive normative misperceptions and producing positive behavioral change and reducing alcohol consequences in collegiate populations (Neighbors et al., 2004; Walters, 2000; Walters et al., 2000), may be easily adapted to address DAD. First, however, research must better ascertain not only how and for which referent groups injunctive normative perceptions relate to DAD, but how misperceptions of referents' attitudes toward drinking-driving, particularly overestimating others' approval, may influence one's motivations and likelihood to engage in DAD. Finally, findings demonstrating the heightened risk faced by heavier drinkers suggest that heavier drinkers may actually feel less intoxicated than blood alcohol concentrations (BACs) may indicate due to developed tolerance (Marczinski and Fillmore, 2009), leading to an increased likelihood for driving under the influence. Perhaps interventions familiarizing students with standard BAC thresholds may be helpful in raising awareness of actual as opposed to perceived intoxication during drinking occasions.

Regardless, the rates of DAD in the current sample suggest that much more work needs to be done in both understanding this risky behavior and implementing successful preventive interventions to curb the rates and reduce the deleterious consequences of DAD on a personal and societal level. This current study identifies several factors associated with DAD while controlling for drinker types that may prove useful intervention avenues for reducing DAD.

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Research Highlights

- The study examined driving after drinking (DAD) among American college students.
- 19.1% reported past 3-month DAD 3 or more drinks.
- Fraternity/sorority membership and family history of alcohol abuse predicted DAD.
- Male gender, medium/heavy drinking, and DAD approval predicted DAD likelihood.
- Alcohol expectancies of sexual enhancement and risk/aggression increased DAD risk.

Table 1

Correlation Matrix of Variables

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	Driving After 3 or More Drinks	--																	
2.	Driving After 5 or More Drinks	.59	--																
3.	Gender (Male)[a]	.12	.09	--															
4.	Race (Caucasian)[b]	.01	.00	.08	--														
5.	Fraternity or Sorority Membership[c]	.10	.06	−.01	.13	--													
6.	Family History[d]	.08	.07	−.07	.15	.05	--												
7.	Moderate Drinker[e]	.20	.11	.04	.12	.16	.07	--											
8.	Heavy Drinker[e]	.17	.21	.14	.06	.12	.05	−.24	--										
9.	Attitudes Toward Drinking After Driving	.33	.35	.07	−.03	−.02	−.01	.10	.12	--									
10.	Injunctive Norms - Close Friend	.22	.24	.03	−.02	−.03	.01	.05	.09	.70	--								
11.	Injunctive Norms - Typical Student	.08	.08	−.13	−.08	−.11	−.01	−.03	−.02	.43	.57	--							
12.	Sociability	.11	.08	.02	.09	.04	.05	.16	.07	.03	.03	−.01	--						
13.	Tension Reduction	.06	.07	.23	.06	−.05	.05	.05	.08	.08	.06	−.01	.37	--					
14.	Liquid Courage	.15	.15	.13	.01	.03	.03	.13	.13	.13	.10	.02	.65	.37	--				
15.	Sexuality	.16	.15	.04	.03	.04	.05	.13	.11	.13	.09	.04	.53	.34	.61	--			
16	Cognitive and Behavioral Imp.	.04	.05	−.01	.02	−.07	.04	.01	.02	.00	.00	−.02	.44	.20	.45	.38	--		
17.	Risk and Aggression	.18	.18	.11	−.05	.04	.01	.12	.13	.15	.12	.03	.52	.20	.78	.55	.49	--	
18.	Self-Perception	.05	.10	.02	−.03	−.03	.01	−.04	.05	.06	.07	.04	.20	.09	.38	.28	.49	.48	--

Note. Correlations of at least /.04/ are significant at $p < .05$; of at least /.05/ are significant at $p < 01$; of at least .06/ are significant at $p < .001$.

[a]For Gender, reference level is female.

[b]For Race, reference level is non-Caucasian.

[c]For Fraternity or Sorority Membership, reference level is non-membership.

[d]For Family History, reference level is no family history.

[e]For Moderate and Heavy Drinker, all other levels within that variable serve as the reference.

Table 2

Percentage Differences as a Function of Driving After 3 or More Drinks

		No		yes		
Variable		***n***	**%**	***n***	**%**	
Gender						36.23***
	Male	830	35.0	273	48.7	
	Female	1543	65.0	288	51.3	
Race						0.55
	Caucasian	1336	57.5	326	59.3	
	non-Caucasian	986	42.5	224	40.7	
Fraternity or Sorority Membership						30.74***
	Member	520	22.1	186	33.2	
	Non-member	1838	77.9	374	66.8	
Family History						20.67***
	Yes	810	34.1	249	44.4	
	No	1563	65.9	312	55.6	
Drinker Type						253.73***
	Light Drinker	1236	52.1	98	17.5	
	Moderate Drinker	1044	44.0	385	68.6	
	Heavy Drinker	93	3.9	78	13.9	

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Mean Differences as a Function of Driving After 3 or More Drinks

	Driving After 3 or More Drinks				
	No		Yes		
Variable	***M***	***SD***	***M***	***SD***	***t*-test**
Attitudes Toward Driving after Drinking	1.15	0.56	1.75	1.07	18.60***
Injunctive Norms - Close Friend	1.34	0.75	1.82	1.06	12.39***
Injunctive Norms - Typical Student	1.76	1.00	1.98	1.10	4.63***
Sociability	2.95	0.68	3.14	0.57	5.92***
Tension Reduction	2.44	0.72	2.55	0.68	3.30***
Liquid Courage	2.30	0.70	2.58	0.68	8.27***
Sexuality	2.09	0.73	2.39	0.69	8.69***
Cognitive and Behavioral Imp.	2.54	0.61	2.59	0.55	2.02*
Risk and Aggression	2.09	0.71	2.41	0.72	9.64***
Self-Perception	1.76	0.62	1.84	0.63	2.67**

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Binary Logistic Repression Model Predicting Driving After 3 or More Drinks (1 = yes, 0 = no)

Predictor	*B*	*S.E.*	Wald	Odds Ratio [95% Cl]	Nagelkerke R^2 change
Step 1: Demographics					.05***
Gender (Male)[a]	0.45	0.12	14.93	1.57*** [1.25, 1.97]	
Race (Caucasian)[b]	−0.19	0.11	2.80	0.83 [0.67, 1.04]	
Fraternity or Sorority Membership[c]	0.34	0.12	8.37	1.41** [1.12, 1.78]	
Family History[d]	0.41	0.11	13.98	1.50*** [1.21, 1.86]	
Step 2: Drinker Type					.11***
Moderate Drinker[e]	1.26	0.13	89.78	3.51*** [2.71, 4.56]	
Heavy Drinker[e]	1.67	0.21	62.29	5.33*** [3.52, 8.07]	
Step 3: Drinking and Driving Norms					.09***
Attitudes Toward Driving After Drinking	0.84	0.10	71.98	2.31*** [1.90, 2.80]	
Injunctive Norms − Close Friend	0.02	0.09	0.04	1.02 [0.85, 1.23]	
Injunctive Norms − Typical Student	−0.05	0.07	0.55	0.95 [0.83, 1.09]	
Step 4: Alcohol Expectancies					.01***
Sociability	0.18	0.12	2.24	1.20 [0.95, 1.53]	
Tension Reduction	−0.11	0.09	1.46	0.90 [0.76, 1.07]	
Liquid Courage	−0.13	0.14	0.83	0.88 [0.67, 1.16]	
Sexuality	0.21	0.10	4.99	1.24* [1.03, 1.49]	
Cognitive and Behavioral Imp.	−0.08	0.12	0.41	0.93 [0.74, 1.17]	
Risk and Aggression	0.32	0.13	6.52	1.38* [1.08, 1.76]	
Self-Perceotion	−0.01	0.11	0.01	0.99 [0.80. 1.22]	

Note. Odds ratio estimates are adjusted after controlling for all other predictors in final model.

[a]For Gender, reference level is female.

[b]For Race, reference level is non-Caucasian.

[c]For Fraternity or Sorority Membership, reference level is non-membership.

[d] For Family History, reference level is no family history.

[e] For Moderate and Heavy Drinker, reference level is Light Drinker.

* $p < .05$.

** $p < .01$.

*** $p < .001$.