Who are the college students behind the wheel after drinking?

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Abstract

Little is known about the differences in demographic/socio-psychological characteristics between college student drivers who drink moderately and those who drink heavily. This study examined characteristics of college students who did not drive after drinking, those who drove after consuming one to four alcoholic drinks, and those who drove after drinking at least five. The data were gathered using the National College Health Assessment tool at a large, public university. A sample of 1,145 undergraduate students with 61% females were included in the final analysis if they had at least one drink within 30 days prior to the survey. Of the students sampled, 441 (38.5%) did not drive after drinking, 335 (29.3%) drove after consuming one to four drinks, and 369 (32.2%) drove after five or more drinks. The results suggest that a student who drives after five or more drinks is more likely to be a white single male, a fraternity member, and over 21 years old. This student is also more likely to have been injured in the past while driving intoxicated; other markers included having multiple sex partners and overestimating the alcohol use of peers. The findings have implications for identifying the most at-risk drunk drivers among college students. Such knowledge may enable health educators to craft more effective alcohol-related messages targeting students who are the most at risk.

***Key words**: College Students, National College Health Assessment, Drinking, Drunk Driving*

Introduction

Alcohol consumption among college students is a serious public health issue because it is closely associated with a wide variety of risky behaviors. Driving under the influence (DUI) is one of them. From 1998 to 2001, the proportion of 18- to 24-year-old college students who reported DUI of alcohol increased from 26.5% to 31.4%, indicating a rise from 2.3 million to 2.8 million students. [1] The 20th National Institute on Alcohol Abuse and Alcoholism (NIAAA) annual surveillance report showed that in 2003 drivers between the ages of 21 and 24 continued to make up the highest proportion (33.3%) of alcohol-related fatal traffic crashes among all age groups. [2]

The consequences of drinking and driving can be fatal and tragic. From 1998 to 2001, alcohol-related unintentional fatalities rose from nearly 1,600 to more than 1,700 among college students. This was an increase of 6% per college population (i.e. 18to 24-year-olds). [1] However, the severe consequences of intoxicated driving seem to have very little impact on students' current behavior. One study showed that participants who had experienced negative consequences of drinking and driving (either as a driver or passenger) reported more current drunk driving and greater alcohol consumption. [3]

Previous studies of young adult drinkers revealed that age (e.g. 21-24 years old), sex (e.g. male), and ethnicity (e.g. White) play roles in large amounts of drinking (i.e. having five or more drinks at one event) [2, 4-8]. In addition to demographic characteristics, several social-psychological factors are reportedly related to college-aged drinking. Some studies show that college students consistently overestimate their peers' alcohol use, [9-12] with one study showing underestimation of amounts of peers' binge drinking. [13] Perceptions of peer drinking might predict alcohol use [10] but they do not necessarily foretell students' desire to increase alcohol consumption. [9] Being a fraternity or sorority member and residing off campus without parents are also reportedly associated with higher amounts of drinking. [14-16] In addition to intoxicated driving, drinking alcohol is also related to other risky behaviors such as unprotected sex. [17]

Though a few studies have focused on demographic and social-psychological characteristics that may contribute to drinking and driving in young adults, [18-20] little is known about the difference of demographic and socio-psychological characteristics between the drivers who had fewer than five drinks and those who had five or more.

Purpose of Study

The purpose of this study was to examine the differences in demographic and socio-psychological characteristics among college students who combined driving and drinking. More specifically, this study compared the characteristics of college students who did not drive after drinking, those who drove after drinking between one and four alcoholic beverages, and those who drove after five or more drinks. It is hypothesized that there would be a significant difference in demographic and social-psychological characteristics among the three groups. The findings of this study are expected to provide information useful in describing the most risky drivers among college students, as well as in helping to develop the specific prevention strategies to target this population.

Methods

Study design

This study employed an observational design using the data collected by the Student Health Services Center at a large, public university in west Texas. The National College Health Assessment was used as the estimation tool to examine the health of this student population. This tool is a frequently used comprehensive survey that assists college health service providers, health educators, counselors, and administrators in collecting data about their students' health-related habits, behaviors, and perceptions. [21] Items contained in the survey address general health status; alcohol, tobacco, and other drug use; sexual health; weight, nutrition, and exercise; mental health; and injury prevention, personal safety, and violence.

Setting and Sample

According to university Institutional Research and Information Management's record, among the 23,595 undergraduates who enrolled in Fall 2003, most (80 %) were between the ages of 19 and 24, about 12% were 18 years old or younger, and nearly 8% were aged 25 and older. As for biological sex, 10,710 (45.39%) of students were female and 12,811 (54.6%) were male. As for ethnicity, 19,318 (81.9%) were non-Hispanic white, Hispanic students comprised 2,583 (10.9%), and 1,694 (7.2%) identified as belonging to other ethnic groups.

Enrolled undergraduate students 18 years and older were eligible for participation.
A total of 1,700 paper surveys were non-randomly distributed to students within several different disciplines in order to represent as many students' academic majors as possible. A total of 1,578 surveys were returned, representing a 92.8% response rate. Of this sample, 61% are females and 39% are males. The mean age of all sampled students was 20.55 (SD=3.32) years old, with 60% being 20 years or younger. Seventy-nine percent of them were non-Hispanic White, 12% were Hispanics, and 9% included non-Hispanic Black, Asian or Pacific Islander, American Indian or Alaskan, and other groups. These ethnicities were grouped together due to their low frequencies (<5%) individually.

While comparing with the whole student population, the majority of the sample was female (61%) while the population had a slight male majority (55%). The sample, which included 79% non-Hispanic white and 12% Hispanic students, very closely represented the actual student population (Non-Hispanic White 81%, Hispanics 11%). Due to discrepancy of age breakdown, no comparison of age could be made between the sample of the population. Note that this sample is a sex skewed.

Data Collection

Upon approval from the university Institutional Review Board, the investigators collected data over a five-month period between October 2003 and February 2004. The investigators contacted instructors in several major academic disciplines for permission to provide their students the opportunity to participate in the survey. With instructors' permission, survey distribution took place in either of the two ways: 1) an investigator visited the class and provided information about the study, then distributed the survey; or 2) the course instructors read a script to their classes containing relevant information about the survey before distributing it. Only the students who signed informed consent forms were given the survey. Students were told that participation was entirely voluntary, and that they would not be penalized for refusing to participate. Respondents either completed the survey during class time or completed the survey outside of class and returned it to the instructor.

Every effort was made to ensure anonymity and confidentiality of the respondents. Additionally, students' identities could not be connected with their survey responses. Names only appeared on the informed-consent forms, which were kept in a locked filing cabinet separate from the surveys.

Variables

The dependent variable is the driving behaviors after drinking. Two questions used to generate the variable were: "Within the last 30 days (#1) did you drive after drinking any alcohol at all?"; and (#2) "did you drive after drinking five or more drinks?" The responses were: (1) not applicable/don't drive, (2) not applicable/don't drink, (3) no, (4) yes. Students who responded "don't drive" or "don't drink" to both questions were excluded from the data analysis. Only students who reported either drinking or driving or both were included, which represented those who drank and could drive a car. Three new categories were generated according to the combined responses of the two questions: (1) didn't drive after drinking at all (those who responded NO to both question #1 and question #2), (2) drove after one to four drinks (those responded YES to question #1 but NO to question #2), (3) drove after five or more drinks (those responded YES to both question #1 and question #2).

Independent variables included in the analysis were: age (<21 years old or >=21 years old), sex (male or female); race/ethnicity (non-Hispanic White, Hispanic or Latino, or Other), fraternity or sorority member (yes or no), relational status (single or married/engaged), place of residence (on campus, off campus alone, or off campus with parents or relative), perceived peers' drinking behavior (number of alcoholic drinks the student thought the typical student at his/her school had the last time he/she partied or socialized), number of sex partners, and experience with previous alcohol-related physical injuries (injured self, and injured others).

Statistical Analysis

The data were analyzed using SPSS (14.0, Chicago, IL). Chi-Square tests were performed to examine the unadjusted associations between intoxicated driving and all independent variables. ANOVA was used to examine the relationship among perceived drinks a typical peer student had at his or her last event, number of sex partners, and intoxicated driving. Multiple logistic regression was employed to determine the impacts of fraternity or sorority membership, relational status, place of residence, perception of peers' drinking, and previous alcohol-related injuries on drinking and driving while controlling for age, sex, and race/ethnicity and using perception of peers' drinking and number sex of

partners as covariates. The significance level was set as .05.

Results

Descriptive Statistics

A total of 1,145 students who had at least one alcoholic drink within 30 days prior to the survey were included in the final analysis. There was no statistically significant difference between the students included in and excluded from the final analysis in terms of age (t=.90, 1451df, p=.19) and sex (X^2=.86, 1df, p=.86). The demographics of the 1,145 students are presented in Table 1.

Of the 1,145 students surveyed, 441 (38.5%) did not drink and drive, 335 (29.3%) drove after one to four drinks, and 369 (32.2%) drove after consuming five or more. The differences of the independent variables among the three groups are presented in Table 1. Chi-square tests showed that sex, age, ethnicity, membership in fraternities or sororities, relational status, and housing status played roles in students' drinking and driving. Students with previous experiences of self-injury or injuring others tended to drive after five or more drinks (injured self X^2=57.15, 2 df, p=.00; injured others X^2=25.12, 2 df, p=.00). The ANOVA revealed that those who drove after five or more drinks overestimated the amount of drinking by typical students at their last event (8.42, SD=3.70) than did their counterparts (those who did not drive after drinking 7.31, SD=3.50; those who drove after drinking one to four drinks 7.27, SD=2.78; F=13.64, p=.000). The same group also reported having more sex partners (2.96, SD=4.00) compared with the other two groups (those who did not drink and drive 1.49, SD=3.03; those who drove after drinking one to four beverages 1.68, SD=1.78; F=25.11, p=.000).

Logistic Regressions

Treating not driving after drinking as the reference of the dependent variable, the multiple logistic regressions revealed different characteristics of those driving after one to four drinks and driving after five or more. When comparing students who drove after one to four drinks with those who did not drink and drive (shown in Table 2), female students (OR=1.54, 95%CI=1.07-2.20), Non-Hispanic Whites (OR=1.94, 95%CI=1.02-3.68), Fraternity or sorority members (OR=1.80, 95%CI=1.29-2.51) and single students (OR=1.49, 95%CI=1.03-2.16) were more likely than their counterparts to drive after having at least one but fewer than four drinks.

When comparing those driving after five or more drinks with those not drinking and driving (shown in Table 3), female students (OR=.55, 95%CI=.38-.79), younger students (<21 years old, OR=.67, 95%CI=.44-.99) , and the students who did not have previous alcohol-related self-injuries (OR=.37, 95%CI=.24-.57) were less likely than their counterparts to drive after five or more drinks. Both non-Hispanic White (OR=4.41, 95%CI=1.98-9.84) and Hispanic (OR=3.10, 95%CI=1.24-7.79) fraternity or sorority members (OR=2.57, 95% CI= 1.77-3.74) and single students (OR=1.53, 95%CI=1.02-2.29) were more likely to drive after five or more drinks compared to other groups. Perception of peers' drinking (b=.07, SE=.03, p=.01) and number of sex partners (b=.30, SE=.05, p=.00) were positively associated with driving after five or more drinks.

Discussion

For discussion purposes, we describe the three groups as safe (i.e. did not drive after drinking), risky (i.e. drove after between one and four drinks) and dangerous (i.e. drove after consuming at least five drinks). The results suggested possible composite profiles of students who fall into one of the three drinking-and-driving (DD) categories. More specifically, this study suggests that a typical risky DD student tends to be a single, white female who is a sorority member. A typical dangerous DD student is likely to be a White or Hispanic single male, a fraternity member, and older than 21 years. The dangerous DD also has injured oneself in the past while driving intoxicated, overestimates peers' use of alcohol, and has more than one sex partner. It is crucial to point out that this description is for categorizing the behaviors in an academic report rather than assuming real consequences that depend on multiple factors. For instance, risky behaviors could also result in fatal accidents.

Ethnicity appeared to be the strongest factor in this study. The analysis suggested that non-Hispanic White students tend to represent dangerous and risky DDs. This result supports prior research revealing that Whites had a higher prevalence of drinking than other ethnic groups.[8] More research could be done to understand the cultural codes and norms involved in drunk driving. Minority (i.e. black, Asian, and other non-White and non Hispanic) students appeared to be less inclined toward intoxicated driving. Considering this result, it may be helpful to study the cultural standards that lead to less or no DD. The findings

could then be incorporated into campaigns promoting safer choices regarding drinking and driving.
As the second strongest factor, previous alcohol-related self-injuries were more likely to be found among dangerous DD students. It is noteworthy that some dangerous DD students did not appear to have learned from their previous experiences. It may be the case that injury, although seen as a factor, may not be perceived as severe enough to warrant a change in a person's drinking and driving habits. Future research should address attitudes about injury as a consequence of intoxicated driving, as well as the attributions students make for these and other consequences, such as risky sex or use of other drugs, [22] and how these behaviors co-occur. [23] It is interesting to see that previous experience with alcohol-related injury to others was not a significant factor of risky or dangerous DD. Fewer students in this study who had experience with injuring others might account for the lack of significance. It may also indicate students would take injuring others more seriously. An implication of this is to educate the student that "Injuring yourself also injures others".

Our findings showed that male students tend to be dangerous DD while female students tend to be risky. This result finds support in other studies revealing that males tend to drink more and have more incidences of intoxicated driving. [2, 7, 24] A relevant finding was that dangerous DD respondents had more sex partners than those in the other two DD groups. Given this study's results, there could be sex or gender effects regarding the motivation behind risk- and sensation-seeking, as suggested by Beck et al. [25] In light of these findings, it would be helpful for future research to examine the motivations of both sexes regarding drinking and driving. In addition, note that women's physiological responses to alcohol are different than men's, and women could be equally impaired with a smaller volume of alcohol. Therefore, these findings should be interpreted with caution because risky DD women could be as hazardous as men in the dangerous DD group. In future research, combining BAC levels and individual circumstances that might determine the consequences of DD is warranted.

Unlike previous findings that revealed young adults ages 18 to 20 had a higher frequency of driving after drinking three or more alcoholic beverages, [8] younger students (<21 years) in this study were less likely to be dangerous DD than their older peers. However, because of the design of the survey questions, this study could not capture the possible difference among age groups between students who had 1-2 drinks and then drove home (i.e, responsible social drinking) and those who had 3-4 drinks. The undetected possible difference might result in the inconsistency of this study with other studies.

It may be helpful to consider the finding on age along with another one revealing that the dangerous DD students appeared to live off campus and not with parents or relatives. A possible explanation is that younger students who were safe or risky DD may either lack their own transportation or may live close enough to avoid intoxicated driving. There also could be an increase in risk-taking as students get older or progress through college. For this reason, it would be crucial to acknowledge that most of the younger students eventually would move off-campus, and thereby increase their risk of becoming dangerous DDs. Ultimately, students may need consistent exposure to important alcohol-related messages all throughout their education.

The last three factors are social-psychological in nature. First of all, heavy drinking and the choice to drive afterwards have also been connected with students' socialization patterns and social networks. [14-16] This study showed a consistent finding that members of fraternities or sororities comprised a larger proportion of students who drove intoxicated. Secondly, this study revealed that single students were more likely to be risky or dangerous DDs than engaged or married students. Finally, dangerous DD respondents were more likely to overrate peer alcohol consumption. It has been established that students consistently overestimate how much alcohol their peers consume; [9-11] this finding may add to the literature that overestimation of peer alcohol consumption might be a predictor of intoxicated driving.

The social-psychological findings above might lead to the following implications. Given the socialization and relational influences on students, health educators might consider using students' social networks or organizations to reach the students to address the interpersonal, social, relational, and organizational factors compelling students to drive or not drive while intoxicated. For example, to target single students, message designers may consider emphasizing the connection that these students have with family members or close friends, as well as the potential impact that drunk driving has on their affected ones. Such messages may serve to remind the students that, although they are not dating or married, they are still involved in important relationships that could be adversely affected by the consequences of drunk driving.

Certain limitations of this study should be addressed. First, the use of a non-random sample may have implications for the generalizability of these findings to other universities and colleges. The non-random method prevented some students from having the chance to participate in the study. Social desirability was another potential threat to the internal validity of the results. Many questions on the survey were sensitive in nature, soliciting information about sexual behavior, potentially illegal activities, and self-destructive habits. Such items may encourage students to underreport their undesirable behaviors. The gender-skewed sample could be the result of self-selection bias. Another concern was allowing some students to complete the survey outside of class. Having students complete the survey in class would help avoid the unlikely, but possible, collusion among respondents. Finally, it is plausible that the actuality of consuming alcohol before driving is more compounded than this study's results suggest. There are other consequences of drunk driving that this study did not address, such as property damage, getting into fights, and being arrested.

Conclusion

Notwithstanding the limitations of this study, the results have heuristic value in that they provide a more global picture with which to identify the most dangerous drivers among college students. They also differentiate those risky DDs from dangerous DDs and suggest different health education strategies. In summary, an effective alcohol campaign strategy should target *more at-risk DD groups* (e.g. younger, White, and male) with *cultural sensitivity* (e.g. Spanish version educational material or positive culture norm), *good timing* (e.g. longitudinal campaign targeting at transition age or when students move off-campus), *better accessibility* (e.g. accessible to those who are not exposed to on-campus campaigns on a regular basis), *multi-avenues* (e.g. through student's organizations and peers), *multiple messages* (e.g. addressing *knowledge* such as the fact that "your peers don't drink as much as you think they do", *attitudes* such as "car accidents happen not because of bad luck, but when you drink", *love* such as "Drinking and driving not only hurts you; it also hurts the ones you love."), and while addressing *multiple risks* (e.g. unprotected sex) simultaneously.

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Table 1. Demographic Difference among three groups of college students (N=1,145)

Variables	Total %	% don't drive at all after drinking	% driving after drinking 1-4 drinks	% driving after having 5 or more drinks	X^2	p
Sex						
Female	60.9	64.5	72.9	45.3		
Male	39.1	35.5	27.1	54.7	54.89	.000
Age						
<21 years old	56.7	63.7	55.7	49.4		
>=21 years old	43.3	36.3	44.3	50.6	16.04	.000
Race						
White	81.2	77.5	82.4	84.4		
Hispanic	12.2	12.2	12.1	12.2		
Other (black, Asian, Indian & other)	6.7	10.3	5.5	3.3	16.93	.002
Fraternity or Sorority member						
Yes	27.2	20.9	30.6	31.8		
No	72.8	79.1	69.4	68.2	14.37	.001
Relationship						
Single	59.8	50.6	59.3	71.4		
Engaged or Married	40.2	49.4	40.7	28.6		
Resident						
On campus housing	29.7	37.9	28.8	20.5		
Off Campus housing	63.2	54.9	62.4	74.0		
With Parents or Other	7.1	7.1	8.8	5.5	34.23	.000
Previous alcohol-related injuries						
Physically injured self	22.0	12.8	19.4	34.9	57.15	.000
Physically injured others	6.1	3.1	4.2	11.2	25.12	.000

Table 2. Multiple logistic regression results for driving after one but fewer than five drinks*

IVs	Categories	β	SE	OR	95% CI		p
					Lower	Upper	
Gender	Female	.43	.18	1.54	1.07	2.20	.02
	Male=reference						
Age	Younger than 21 years	-.28	.19	.75	.52	1.09	.14
	21 years & older= reference						
Race	White	0.66	0.33	1.94	1.02	3.68	0.04
	Hispanic	0.68	0.39	1.97	0.92	4.20	0.08
	Other=references						
Fraternity or Sorority member	Yes	0.59	0.17	1.80	1.29	2.51	0.00
	No=reference						
Relationship	Single	0.40	0.19	1.49	1.03	2.16	0.03
	Married/Engaged= reference						
Resident	On campus housing	-0.49	0.33	0.61	0.32	1.17	0.14
	Off Campus housing	-0.04	0.31	0.96	0.53	1.76	0.90
	With Parents or Other=reference						
Previous alcohol-related injuries	Did not injury self	-0.41	0.23	0.67	0.43	1.05	0.08
	Physically injured self =reference						
	Did not injury others	-0.02	0.45	0.98	0.41	2.37	0.97
	Physically injured others =reference						
Perceived Peer's drinking		-0.03	0.03	0.97	0.92	1.02	0.30
# of sex partners		0.11	0.05	1.11	1.00	1.24	0.05

* Did not drive at all after drinking as reference

Table 3. Multiple logistic regression results for driving after at least five drinks*

IVs	Categories	β	SE	OR	95% CI		p
					Lower	Upper	
Gender	Female	-0.60	0.19	0.55	0.38	0.79	0.00
	Male=reference						
Age	Younger than 21 years	-0.41	0.21	0.67	0.44	0.99	0.04
	21 years and older= reference						
Race	White	1.48	0.41	4.41	1.98	9.84	0.00
	Hispanic	1.13	0.47	3.10	1.24	7.79	0.02
	Other=references						
Fraternity or Sorority member	Yes	0.95	0.19	2.57	1.77	3.74	0.00
	No=reference						
Relationship	Single	0.43	0.21	1.53	1.02	2.29	0.04
	Married/ Engaged=reference						
Resident	On campus housing	-0.73	0.39	0.48	0.22	1.04	0.06
	Off Campus housing	0.29	0.36	1.34	0.66	2.73	0.42
	With Parents or Other=reference						
Previous alcohol-related injuries	Did not injury self	-1.00	0.23	0.37	0.24	0.57	0.00
	Physically injured self =reference						
	Did not injury others	-0.51	0.40	0.60	0.27	1.32	0.20
	Physically injured others =reference						
Perception of Peer's drinking		0.07	0.03	1.07	1.02	1.07	0.01
# of sex partners		0.30	0.05	1.35	1.22	1.35	0.00

* Did not drive at all after drinking as reference