

# Correlates of College Student Binge Drinking

## ABSTRACT

**Objectives.** This study examines the individual correlates of college student binge drinking.

**Methods.** Questionnaires were completed by a representative national sample ( $n = 17\,592$ ) of students on 140 campuses in 1993. Binge drinking was defined as five or more drinks per episode for men and as four or more drinks per episode for women.

**Results.** Overall, 44% of the students (50% of the men and 39% of the women) binged. While demographic factors such as sex and race were significantly related to binge drinking, prior bingeing in high school was crucial, suggesting that for many students, binge drinking begins before college. The strongest predictors of college binge drinking were residence in a fraternity or sorority, adoption of a party-centered lifestyle, and engagement in other risky behaviors.

**Conclusions.** Interventions must be targeted at high school binge drinking as well as at several characteristics of college life—most notably fraternity residence. Legal drinking age fails to predict binge drinking, raising questions about the effectiveness of the legal minimum drinking age of 21 in college alcohol policies. (*Am J Public Health.* 1995;85:921-926)

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### Introduction

Alcohol abuse is both one of the most important contributors to preventable morbidity and mortality in contemporary America and among the most difficult public health challenges.<sup>1-6</sup> College students, who are in an age group that has the highest rate of binge drinking, are at an even higher risk for heavy episodic drinking than their peers who do not attend college.<sup>1</sup> Historical,<sup>7</sup> anthropological,<sup>8</sup> and epidemiological<sup>9-11</sup> analyses point to the pervasiveness of binge drinking in the college experience. Recent epidemiological evidence demonstrates clearly that bingeing is associated with substantially higher risks of acute health problems such as serious injury, especially resulting from auto crashes; unplanned and unsafe sex; assault and aggressive behavior; and a spectrum of drinking-related social and psychological problems.<sup>9,11</sup> Thus, binge drinking is arguably the No. 1 public health hazard and the primary source of preventable morbidity and mortality for the more than 6 million full-time college students in America.

Most previous studies of drinking by college students have been conducted on single college campuses. However, because recent multicollge studies often have selected schools on the basis of availability or interest rather than at random,<sup>9,12</sup> and have used convenience samples rather than a random sampling of all students,<sup>13</sup> the generalizability of their findings is limited.

Previous studies have used the same definition of heavy or binge drinking for men and women, without taking into account gender differences in body mass or ethanol metabolism. They have also relied on analyses that did not control for the many factors presumed to predict

binge drinking. This paper uses a sex-specific definition of heavy or binge drinking,<sup>14</sup> a multivariate statistical analysis, and a representative sample of college students<sup>11</sup> to examine the nature and extent of the binge drinking, which has been associated with problems for students who drink and others on the college campus. Specifically, it reports on a national survey of 17 592 students at 140 American colleges that examined the extent to which background factors, previous experience with alcohol, status in school, attitudes about drinking, involvement with school activities, time spent in different activities at college, and participation in other high-risk behaviors other than bingeing are related to binge drinking.

### Methods

#### The Sample

A national sample was selected from the American Council on Education's list of accredited 4-year colleges by using probability proportionate to size of enrollment; the sample is described elsewhere.<sup>11</sup> One hundred forty (72%) of the sample of 195 colleges agreed to participate. The primary reason for nonparticipation was an inability to provide a random

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sample of students and their addresses within the time requirements of the study.

The 140 participating colleges, which are located in 40 states and the District of Columbia, represent a cross-section of American higher education. Two thirds of the colleges are public, and one third are private. Approximately two thirds are located in a suburban or urban setting, and one third are in a small town or rural setting. As to their regional diversity, 24% are in the Northeast, 32% are in the North Central region, 26% are in the South, and 18% are in the West. Of the 23 colleges in the sample that are church-related, 11 are Roman Catholic. Additionally, the colleges vary in size: 6% have fewer than 1000 students; 26% have between 1000 and 5000 students; 21% have between 5000 and 10 000 students; and 47% have more than 10 000 students. Four percent of the institutions are women-only, and 4% are predominantly Black. Slightly more than half are members of the National Collegiate Athletic Association Division I, indicating that they participate in major intercollegiate sports.

For the sample of undergraduate students, each of 127 larger colleges provided 215 students, and each of 13 smaller colleges provided 108 students. The final student sample included 28 709 students. This sample contained more women than men (58% vs 42%), owing in part to the inclusion of six all-women's institutions. The sample was predominantly White (81%); minority groups included Asians/Pacific Islanders (7%), Spanish/Hispanic Americans (7%), Blacks (6%), and Native Americans (1%). Forty-five percent of the students were younger than 21 years, 38% were aged 21 to 23 years, and 17% were aged 24 years or more. There were slightly more juniors (25%) and seniors (26%) in the sample than freshmen (20%) and sophomores (19%), probably because 30% of the students were transfers from other institutions. Ten percent of the students were in their fifth undergraduate year of school or beyond.<sup>11</sup>

### *The Questionnaire and Response Rate*

The 20-page questionnaire asked for very detailed information about drinking behavior and several other variables. It was constructed to include items that previous research had identified as important predictors of binge drinking in college.<sup>1,9,10</sup> These questions were used to construct a measure of binge drinking, defined in this study as drinking five or

more drinks in a row for men and four or more drinks in a row for women over the past 2 weeks.<sup>14</sup>

Of the 28 709 students to whom questionnaires were mailed, 3082 students were eliminated from the sample because of school reports of incorrect addresses, withdrawal from school, or leaves of absence. This reduced the sample size to 25 627. A total of 17 592 students returned questionnaires, yielding an overall response rate of 69%.

### *Statistical Analysis*

The present research builds on an analysis reported by Andréasson and colleagues<sup>15,16</sup> who developed a model of the antecedents and covariates of high alcohol consumption among male Swedish conscripts. Andréasson et al. used a two-step modeling process. First, they selected from the data set five sets of variables, a total of 26 variables in all. Second, they entered into a multiple logistic model a smaller number of variables that proved to be significant individual predictors of high alcohol consumption. The present analysis follows this two-part approach using American college student data.

Data analysis used the Statistical Analysis System (SAS) Proc Logistic, Version 6.07, to fit the logistic model.<sup>17</sup> Odds ratios (ORs) are presented in the text, and both odds ratios and 95% confidence intervals (CIs) are given in the tables. Variables that describe aspects of current drinking (such as attitudes about the importance of drinking in college or the availability of beer in the student's room) were so highly correlated with binge drinking as to be virtually tautological, so they were excluded from later analysis. But it is worth noting that students who state that drinking in college is important or very important are at a very high risk of binge drinking (OR = 25.06; 95% CI = 20.78, 30.21). Other variables were omitted because they either were highly intercorrelated with each other or showed no association with binge drinking. Following standard epidemiological practice, basic demographic variables such as age, sex, and race were kept in the final logistic model.

### *Results*

This paper presents the student correlates of binge drinking. A separate paper will explore how various college characteristics (e.g., size, academic competitiveness, urban or rural location, re-

gion, special student composition, religious auspices, National Collegiate Athletic Association classification, public vs private sponsorship) may play a role in binge drinking, controlling for what has been learned in the present analysis about the relationship between individual student characteristics and binge drinking.

Overall, 44% of the students were classified as binge drinkers, with 50% of the men drinking five or more drinks in a row and 39% of the women drinking four or more drinks in a row at least once in the 2 weeks prior to answering the questionnaire.

The individual correlates of binge drinking were examined first. Table 1 presents the odds ratios and 95% confidence intervals from the logistic regressions for each of the independent variables. These results report on the prediction of binge drinking for each predictor variable (recoded into a dummy variable). If the confidence interval includes 1.00, the odds ratio is not statistically significant at the .05 level.

### *Demographic Variables*

Age played only a modest role in predicting binge drinking in this sample, with the legal drinking age being of almost no predictive value. A preliminary logistic regression compared the odds ratios of students below age 21 with the odds ratios of those aged 21 and above, and showed that being below age 21 had an odds ratio of 1.14 (95% CI = 1.08, 1.22). Thus, minimum age drinking laws have virtually no impact on binge drinking. By contrast, the odds of binge drinking were much higher below age 24 than above it (OR = 2.25); a variable contrasting these two groups was included in these analyses and is presented in Table 1. Year in school had no effect.

Each of the following variables—being male, White, and single—elevated the risk of binge drinking; somewhat smaller effects were noted for having at least one parent who had earned a college degree. With the exception of being White (OR = 2.96) and single (OR = 3.55), however, demographic variables had only modest effects and contributed relatively little to an understanding of binge drinking. Race remained an important factor in understanding the diversity of binge drinking across college campuses.<sup>18,19</sup>

### *Precollege Drinking*

Whether the student binged during a typical drinking episode in the last year of

high school was a very strong predictor of college bingeing (OR = 4.86). Whether a parent was an abstainer had only a moderate effect, and familial approval had a slight effect.

### College Lifestyle Choices

By far the strongest effects noted in this analysis came from several variables that measure a student's commitment to different college lifestyle choices. Foremost among these variables was the importance of parties, as measured by the proportion of students who, when asked "How important is it for you to participate in the following activities in college?" answered "very important" or "important" with regard to parties (OR = 5.38).

A particularly strong attitudinal item predictive of bingeing was the student's assessment of the importance of religion: Those who stated that participating in religion was "not at all important" to them had a much higher likelihood of bingeing than other students (OR = 3.57). Somewhat more modest effects were found for the importance of academic work, the arts, and community service. Students viewing these areas as only "somewhat important" or "not at all important" were more likely to binge. In contrast, those who strongly valued athletics were more likely to binge.

### Status in School

Several measures of a student's residence and status in school proved to be predictors of bingeing. The most significant was residence in a fraternity (OR = 6.96). Small but interesting effects link bingeing with having a B average or lower and with majoring in business. Being part of campus social life (by living in a coeducational dormitory, having five or more friends, or having a roommate) raises the odds of bingeing. By contrast, a student's poor integration into the formal advising program of a campus (not having a member of the faculty or the administration with whom one could discuss a problem) had little effect. Whether one was a transfer student had no effect.

### Risky Behaviors

Students who engaged in other forms of risky behavior—in particular, using marijuana within the past month (OR = 7.13), but also having several sex partners in the month before the survey (OR = 2.80) and smoking cigarettes (OR = 4.02)—were much more likely to binge drink.<sup>20-22</sup> But another risky behav-

**TABLE 1—Logistic Regression Results for Individual Correlates of Binge Drinking among College Students (n = 17 592)**

	OR	95% CI	Description
<b>Demographic variables</b>			
Age	1.00		Age is 24 years or older
	2.25	2.06, 2.46	Age is less than 24 years
Marital status	1.00		Married or other
	3.55	3.16, 4.00	Never married
Race	1.00		Non-White
	2.96	2.71, 3.24	White
Hispanic origin	1.00		Non-Hispanic
	1.30	1.44, 1.47	Spanish or Hispanic origin
Sex	1.00		Female
	1.55	1.46, 1.65	Male
Parental college	1.00		Neither parent was a college graduate
	1.44	1.35, 1.53	A parent was a college graduate
<b>Precollege drinking</b>			
Bingeing in high school	1.00		Did not binge in high school
	4.86	4.53, 5.21	Binged in high school
Parental abstention	1.00		Parent was an abstainer
	2.15	1.97, 2.34	Parent was not an abstainer
Family view of alcohol	1.00		Family did not approve of drinking
	1.42	1.32, 1.51	Family approved of alcohol use
<b>College lifestyle choices</b>			
Parties	1.00		Parties are not very important
	5.38	5.00, 5.80	Parties are very important or important
Religion	1.00		Religion is very important
	3.57	3.24, 3.94	Religion is not very important
Athletics	1.00		Athletics are not very important or important
	1.81	1.70, 1.94	Athletics are very important or important
Community service	1.00		Community service is very important
	1.52	1.42, 1.62	Community service is not very important
Arts	1.00		Arts are very important
	1.39	1.29, 1.50	Arts are not very important
Academics	1.00		Academic work is very important
	1.44	1.35, 1.54	Academic work is not very important
<b>Status in school</b>			
Fraternity residence	1.00		Does not live in fraternity or sorority
	6.96	5.54, 8.73	Lives in fraternity or sorority
Roommate	1.00		Has no roommate
	2.66	2.49, 2.83	Lives with roommate
Five or more friends	1.00		Has fewer than five close student friends
	1.87	1.76, 1.99	Has five or more close student friends
Grades	1.00		Grade point average is B+ or better
	1.56	1.47, 1.66	Grade point average is B or less
Faculty confidant	1.00		Has faculty or administrator confidant
	1.36	1.28, 1.45	Does not have faculty/administrator confidant
Business major	1.00		Does not major in business
	1.28	1.19, 1.39	Majors in business
Coed dormitory	1.00		Does not live in coeducational dormitory
	1.51	1.40, 1.63	Lives in coeducational dormitory

*continued*

TABLE 1—Continued

	OR	95% CI	Description
<b>Risky behavior</b>			
Marijuana use	1.00		Has not used marijuana in last month
	7.13	6.36, 7.99	Has used marijuana in last month
Cigarette use	1.00		Does not use cigarettes
	4.02	3.71, 4.36	Uses cigarettes on a typical day
Sexual activity	1.00		Has fewer than two sex partners in a month
	2.80	2.40, 3.27	Has two or more sex partners in a month
<b>Hours per day spent in activities</b>			
Socializing with friends	1.00		Hours socializing are 2 or less
	2.16	2.03, 2.30	Hours socializing are more than 2
Studying	1.00		Hours studying are 4 or more
	1.49	1.40, 1.60	Hours studying are less than 4
Doing volunteer work	1.00		Hours in volunteer work are more than 0
	1.40	1.29, 1.50	Hours in volunteer work are none
Doing other physical activity	1.00		Hours in other physical activity are 1 or less
	1.38	1.28, 1.48	Hours in other physical activity are more than 1
Working for wages	1.00		Hours of working for wages are more than 2
	1.28	1.20, 1.36	Hours of working for wages are 2 or less
Sleeping	1.00		Hours of sleeping are 6 or less
	1.17	1.10, 1.24	Hours of sleeping are more than 6
Watching television	1.00		Hours of television watched are 2 or less
	1.16	1.09, 1.24	Hours of television watched are more than 2
Participating in student organizations	1.00		Hours in student organizations are more than 0
	0.97	0.91, 1.03	Hours in student organizations are none

Note OR = odds ratio; CI = confidence interval.

ior, not using condoms during sex, was not a predictor.

### Hours Spent in Activities

Spending time on such activities as socializing with friends (OR = 2.16) and participating in physical activity (OR = 1.38) proved to be associated with bingeing, as did spending fewer hours in studying and volunteer work. Hours spent watching television or videos did not predict bingeing.

### Multivariate Analyses

A series of multiple and logistic regression analyses was undertaken to provide the best statistical prediction of bingeing with the smallest number of independent variables.<sup>15,16</sup> Table 2 presents the final results, in which 18 variables were used in a multiple logistic regression analysis to predict bingeing.

Commitment to a lifestyle emphasizing parties stands out. The adjusted odds ratio for the variable indicating the subjective importance of parties is particularly strong (OR = 3.40), with students who agree that parties are "important" or "very important" having more than three times the risk of bingeing compared with those who do not consider parties important. Whether a student bingeed in the last year of high school also proved to be a very useful predictor (OR = 2.84).

Engaging in other risky behaviors emerges as a very strong predictor in this final model. Two substance use variables, using marijuana (OR = 2.96) and smoking (OR = 2.58), exhibited significant predictive power. A third risky behavior, having two or more sex partners in the last month (OR = 1.66), was also a moderate predictor.

As expected, indicators of college living arrangements, such as living with a

roommate and never having been married, were predictive of bingeing; and fraternity or sorority residence remained an extremely strong predictor (OR = 4.08) in the final model.

When other variables are controlled, the higher risk of being male largely disappears. Of the demographic items, only race (being White) and age (being less than 24 years) remained important in the final model. Among the attitudinal items, a student's assessment of religion as being "not very important" also remained strongly predictive of bingeing (OR = 2.40).

Having a parent who drank (regardless of the level and of the parent's sex) was the only family alcohol use variable to appear in the final model (OR = 1.55). The only other variables retained in this analysis were believing in the importance of athletics and spending more than the average amount of time socializing and less than the average amount studying; these constitute further evidence of the importance of a lifestyle centering on social life in explaining binge drinking.

Several caveats should be stated about these conclusions. The data are based on self-administered questionnaires, so some concern should be noted about reporting bias. However, recent research has tended to support the validity of this approach in understanding drinking behavior.<sup>23-28</sup> The data about high school bingeing in this cross-sectional study are retrospective although the behavior being reported on is, for younger students, quite recent. Also, while it would be valuable to examine the impact of college bingeing on subsequent alcohol use, these cross-sectional data cannot shed light on that issue.

Both the likelihood ratio and the score tests of the multiple logistic regression statistically reject the hypothesis that all coefficients are zero in the underlying population ( $P = .0001$ ). A pseudo  $R$ -squared statistic of 0.27 is consistent with an ordinary least squares multiple regression, which shows that roughly a third of the variation in the binge drinking dichotomy could be accounted for statistically by the model. Given that all variables are dichotomized and that binge drinking is a prevalent outcome in this sample, these results support a conclusion that the level of statistical explanation is adequate.

An examination of the final model for men and women separately, the most theoretically plausible interaction, showed

little difference by sex. The most intriguing finding was that sorority residence had a much higher odds ratio for women than fraternity residence had for men.

## Discussion

The findings of the present study show that binge drinking is widespread among American college students. The study defined binge drinking as at least one episode of five or more drinks for men and of four or more drinks for women during the past 2 weeks. A near-majority of men and a large minority of women qualified as binge drinkers under this definition. A fifth of American undergraduates binged three or more times in the same 2-week period.<sup>11</sup>

Far from being an innocent rite of passage, college binge drinking has been found to be a significant risk factor for health problems.<sup>9,11</sup> Recent research has shown it to be indicative of a drinking style that is characterized by more frequent and heavier alcohol use, intoxication, and drinking to get drunk.<sup>11</sup>

The results partly confirm that the stereotype of the prototypical college binge drinker is grounded in reality. As many college personnel already suspect, being male, being White, having parents who were college educated, majoring in business, being a resident of a fraternity, engaging in risky behaviors, being involved in athletics, indulging in binge drinking as high school seniors, and, most importantly, viewing parties as very important are all associated with binge drinking. It is thus not surprising that college policies and programs intended to curb binge drinking appear to have brought about few changes.<sup>9</sup>

That binge drinking is tied to some of the most desired aspects of American college life—parties, social lines, dormitory living, athletics, and interaction with friends—is of great concern. Prevention programs will have to contend with the centrality of alcohol in the lives of many students, who are not merely passive victims of peer pressure but willing participants. To combat the problem effectively, public health will need to separate out the harmful effects of bingeing from the role of bingeing in American undergraduate life.

Being age 21 and over does not by itself predict binge drinking; thus, the most important public policy on drinking for the traditional-age college student—the legal minimum drinking age—appears at present to be largely ineffectual. This finding hardly encourages the notion that

**TABLE 2—Final Logistic Regression Results for Correlates of Binge Drinking among College Students (n = 17 592)**

	Conditional OR	95% CI	Description
Age	1.00		Age is 24 years or older
	1.53	1.36, 1.71	Age is less than 24 years
Race	1.00		Non-White
	2.37	2.12, 2.65	White
Sex	1.00		Sex: female
	1.19	1.09, 1.29	Sex: male
Binging in high school	1.00		Did not binge in high school
	2.84	2.60, 3.10	Binged in high school
Parental abstention	1.00		Parent was an abstainer
	1.55	1.39, 1.73	Parent was not an abstainer
Parties	1.00		Parties are not very important
	3.40	3.10, 3.73	Parties are very important or important
Religion	1.00		Religion is very important
	2.40	2.13, 2.72	Religion is not very important
Athletics	1.00		Athletics are not very important or important
	1.47	1.34, 1.61	Athletics are very important or important
Community service	1.00		Community service is very important
	1.26	1.16, 1.37	Community service is not very important
Fraternity residence	1.00		Does not live in fraternity or sorority
	4.08	3.12, 5.35	Lives in fraternity or sorority
Five or more friends	1.00		Has fewer than five close student friends
	1.36	1.25, 1.47	Has five or more close student friends
Grades	1.00		Grade point average is B+ or better
	1.29	1.19, 1.40	Grade point average is B or less
Coed dormitory	1.00		Does not live in coeducational dormitory
	1.12	1.01, 1.24	Lives in coeducational dormitory
Marijuana use	1.00		Has not used marijuana in last month
	2.96	2.57, 3.41	Has used marijuana in last month
Cigarette use	1.00		Does not use cigarettes
	2.58	2.33, 2.87	Uses cigarettes on a typical day
Sexual activity	1.00		Has fewer than two sex partners in a month
	1.66	1.35, 2.03	Has two or more sex partners in a month
Socializing with friends	1.00		Hours socializing are 2 or less
	1.36	1.25, 1.48	Hours socializing are more than 2
Studying	1.00		Hours studying are 4 or more
	1.15	1.06, 1.25	Hours studying are less than 4

Note. OR = odds ratio; CI = confidence interval.

“cracking down” on underage drinking on campus will be easy. High school binge drinking is a major risk factor for college binge drinking, which suggests that drinking and binge drinking are behaviors with

some history even for this young population. On a more positive note, it appears that high school bingeing may be in decline, presaging a modest future decline in college bingeing. Yet, as in the case of age,

a student's year in college does not appear to be of any value in predicting binge drinking. The assumption (seemingly widely held by college officials) that freshmen are at particular risk of bingeing is not supported by our data, which instead show virtually identical rates of bingeing across the different years in college.

The findings point to the difficulty of reducing binge drinking and associated health problems. What is needed is a concerted and sustained public health strategy for college campuses. This strategy should be aimed at heavy drinking among college students and the problems it produces for both the binge drinker and those in the binge drinker's immediate environment, and it should begin with the primary emphasis being placed on the documented hazards to individual health. For its part, public health research might focus on alternative activities and programs that would lower rates of binge drinking or weaken the link between binge drinking and adverse health outcomes. In the meantime, college binge drinking (as opposed to moderate or occasional drinking) must be clearly identified as a major acute and long-term health problem, and its standing on the agenda of higher education institutions and public health must be raised dramatically. □

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