

# DO COLLEGE ATHLETES FREQUENTLY MISUSE ALCOHOL? EXAMINING THE EFFECTS OF SPORTS ON DRINKING BEHAVIOR

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Author:  
Jennifer Teets

Faculty Sponsor:  
Tim Clydesdale  
*Department of Sociology*

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## ABSTRACT

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Research literature shows that college student athletes drink more frequently and in greater quantity than their non-athlete peers. What is it about collegiate athletics that increases the tendency to use alcohol excessively? This paper hypothesized that “team sport” athletes (e.g., soccer) would drink frequently and in larger quantities than “individual sport” athletes (e.g., track). Analyses of a 2006 survey of 795 students attending a large public northeastern university revealed individual and team sport athletes drank at the same rate and volume as non-athletes. Alcohol consumption behaviors were explained not by athletic status but by other variables, including: race – whites are more likely to overconsume than any other racial group, place of residency – those who do not live in their parents’ home, and especially those who reside in a fraternity or sorority house, consume more and more frequently than those who reside with their parents. Age, sex, and GPA also had a significant relationship with alcohol consumption behaviors. Student characteristics that influence alcohol consumption behaviors, and their implications, are discussed.

## INTRODUCTION

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Alcohol use and misuse on American college campuses is a well-known phenomenon, though the reasons for this behavior are less understood. While drinking itself, although illegal for those under the age of 21, may not necessarily be harmful, many and varied negative consequences result from excessive drinking. Academic failure, injury, sexual assault, and even death are associated with high levels of alcohol consumption. To understand patterns of college student consumption, subgroups of students have received close attention, and college athletes in particular. While it is logical to expect that student-athletes would understand the importance of taking proper care of their bodies, including moderation in the use of alcohol, it is a common subcultural norm among athletes to consume alcohol, and to do so frequently and in large quantities. Moreover, there is often an association between the type of sport and this pattern of overconsumption; studies show that participation in team sports, as opposed to individual sports, is linked to more frequent use and misuse of alcohol.

Thus, this paper’s research question is as follows: do college athletes, and team sport athletes in particular, get drunk and binge drink more than non-athletes? This paper reviews the current literature on this topic, focusing on alcohol-related behaviors of college athletes and non-athletes, their mental health and wellbeing, and their tendency to engage in risk behaviors. Next, it describes the dataset and how variables were conceptualized and measured. Descriptive statistics, bivariate correlations, and regression results follow. The conclusion applies these findings to my hypothesis as well as to the larger sociological picture, discusses limitations, and offers suggestions for future research.

## LITERATURE REVIEW

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### *Alcohol and Participation in Athletics*

Many studies document a connection between alcohol use and participation in athletics (Tewksbury, Higgins, and Mustaine 2008; Terry-McElrath and O'Malley 2011; Hallingberg et al. 2014). Tewksbury *et al.* sought to identify "predictors of binge drinking among students who are and are not members of intercollegiate athletic teams" (2008:279). During one semester these researchers administered surveys that included questions about binge drinking (utilizing the operationalized definition of 5 or more drinks in a row on a single occasion), social/demographic characteristics, and behaviors related to school, living situations, and social situations. They found certain variables associated with binge drinking across both college athletes and non-athletes. However, for student-athletes, living off campus was closely related to increased odds of binge drinking, indicating distinct social situations or the absence of campus oversight. Variables related to non-athletes' binge drinking were more diverse, including race and studying fewer hours per week. It is important to note that non-athlete students are more populous and diverse than athletes.

Terry-McElrath and O'Malley delved into the relationship between Participation in Sports, Athletics or Exercising (PSAE) and substance abuse in early adulthood, utilizing data from the U.S. National Institute on Drug Abuse-sponsored Monitoring the Future (MTF) study (2011). This annual, nationally representative study of approximately 15,000 high school seniors from nearly 130 schools includes self-administered classroom surveys along with a representative random subsample of 2,400 seniors selected for longitudinal follow-up, with substance users being over-sampled. Terry-McElrath and O'Malley's analysis found that PSAE was related negatively, albeit moderately, to cigarette and marijuana use frequency and to use of illicit drugs other than marijuana at age 18, and that an increase in PSAE was related to a decrease in the use of these three classes of substances in early adulthood. At the same time, they found that school athletic team participation at age 18 was associated with higher alcohol use frequency—a finding that calls for further research.

Some scholars point to the role of participation in organized activities such as sports in delinquent behavior (Hallingberg *et al.* 2014). Hallingberg *et al.* recruited 93 young offenders between the ages of 13 and 18 years old from a Youth Offending Team (YOT), organized by each local authority in England and Wales with the goal of preventing recidivism by identifying and meeting the needs of youngsters (2014:30). A control group of 53 non-offenders was recruited from local schools in the same area as the YOT so that socioeconomic factors would be similar across both groups. The researchers used a questionnaire measuring behavioral problems and competencies in youth aged 11-18 years to evaluate participation in organized activities, and they used the four-question Fast Alcohol Screening Test (FAST) to measure hazardous drinking. Hallingberg *et al.* found, not surprisingly, that young offenders participated in significantly fewer organized activities than non-offenders and also participated in significantly higher levels of hazardous drinking. Young offenders who participated in no organized activities had significantly higher scores on hazardous drinking than non-offenders, but when comparing young offenders and non-offenders who participated in at least one team sport, there was no difference. The conclusion that participation in a team sport was associated with less hazardous drinking for the offenders suggests that those who might benefit most from participation in sports—vulnerable youths—have the most limited access to sports. Also noteworthy was an inverse relationship between team activities and drinking for non-offenders; team activities increased their likelihood of hazardous drinking. Therefore, although this age group is younger than the college students this paper is focused on, this study is highly salient to this paper's research question.

Research into self-reported drinking and drug use indicates severe underreporting biases. Druckman *et al.* addressed self-report biases related to drug usage and heavy drinking, anticipating that levels of both behaviors would be significantly underreported (2015:369). Emailing a survey to every single student-athlete within the NCAA Big Ten conference yielded a response rate of 31.8 percent, higher than the typical response rate for email surveys of similar length, and especially those that do not use incentives. The researchers then employed list experiments to gauge aggregate usage of drugs and alcohol, which is known as a valid technique for addressing documented underreporting in these areas. They found overwhelming evidence of banned drug and alcohol usage, including heavy drinking, among college student-athletes, confirming their hypothesis that self-reports produce underreporting. The

implications here are significant: college student athletes may drink and use drugs far more than they report.

#### *Wellbeing and Participation in Athletics*

Participation in sports may improve overall mental wellbeing and mechanisms for maintaining mental health, according to several scholars. Downward and Rasciute examined the impact of sports participation upon the subjective wellbeing of individuals. In the United Kingdom, where Downward & Rasciute conducted their research, current public policy emphasizes participation in sports activity for the health and well-being benefits of individuals as well as the benefits to society (2011:331). Controlling for personal and socio-demographic characteristics that could affect wellbeing, they found participation in sports had a positive effect upon subjective wellbeing, using a three-year repeated cross-sectional survey of over 28,000 respondents in which one individual aged 16 years or older from a randomly sampled household was interviewed. If sports participation improves happiness and wellbeing, then one can reason that athletes' drinking is not a function of poor mental health or low self-esteem; something else is at play.

Other research on athletic involvement presents evidence of bolstered mental health. Utilizing the same dataset as this paper does, Miller and Hoffman examined athletic involvement, gender, and depression and suicidal behavior in a sample of 791 undergraduate students (2009:335). They confirmed previous linkages between physical activity or sports participation with improved mental and social wellbeing. Their results showed that participation in a team sport as well as an athlete identity were associated with lower depression scores. Therefore, this paper uses an established depression scale as a control variable. Since participation in sports, and especially team sports, produces better mental health, the higher likelihood of athletes to binge drink becomes more intriguing.

A third study that addressed mental wellbeing was an examination of racial and gender differences in what competitive athletes perceived as highly intense sport-related sources of acute stress (Anshel, Sutarso, and Jubenville 2009:159). Anshel and Sutarso, two of the study's authors, developed scales that required the undergraduate respondents, who had all competed in a sport on a high school team, to indicate their perceived stress intensity and their typical coping responses to their two most intense stressors. The most significant findings involve the differences in coping mechanisms between male and female athletes. Female athletes tended to be more inclined to cope by social support and help-seeking, and in general their coping efforts were more intense than those of male athletes. Male athletes were more inclined to use active coping and venting emotions than female athletes. The males' approach method of coping, as the study's authors called it, loosely aligns with the phenomenon of engaging in risky drinking behavior; whereas one cannot receive social support or actual help from alcohol, one who chooses to binge drink in order to aid in handling his or her stress is utilizing an active form of coping so to speak, choosing to approach and confront stressors rather than avoid them.

#### *Risk Behaviors and Sports*

Scholars claim that participation in sports and organized activities increases risk behaviors. Geisner *et al.* examined the effects of additional stressors that high school athletes face, which can include drinking, dieting and gambling (2012:156). High school seniors involved in sports drank more than those who were not, and they also showed a stronger tendency to gamble and diet. Kort-Butler and Martin examined the relationship between the activities in which one participated in high school and risky behaviors, such as binge drinking, drug use, and law violation, among a college sample (2015). They found that those with a high school portfolio focused solely on sports had similar and, in some cases, even poorer outcomes than those who had low involvement in extracurricular activities in high school. These outcomes included more involvement in binge drinking and law violation. Their conclusion was that involvement across a variety of activities during high school was most beneficial as opposed to a narrow sports focus or limited involvement in anything.

An additional article on risk behavior among college athletes compared behaviors by sport. At one large public university in the Northeast United States, Gage conducted a survey involving students who had never played a varsity sport in college, students who played football—a sport with relatively high status on campus, and students who played tennis or competed in track and field—sports with

marginal status on campus (2008). The athletes in high status sports (such as football) had significantly higher scores on hyper-masculinity scales, had lower attitudes toward women, and exhibited more sexual aggression and sexual activity than men in marginal sports (such as track and field) or non-athletes (1014). A clear implication is that the type of varsity sport played, rather than simply varsity sport participation, has an important relationship with attitudes and risk behaviors among male athletes.

In sum, there are three main findings in the literature. 1) Participation in athletics among high school and college students, particularly when the specific sport is team-oriented, is linked to greater frequency of alcohol consumption and a higher tendency to binge drink. 2) Athletes, especially male athletes, are more likely to engage in risk behaviors than non-athletes. 3) Participation in sports is associated with greater mental health and wellbeing. This paper hypothesizes that participation in college athletics, and team sports in particular (e.g., soccer, football, basketball), is associated with greater and more frequent consumption of alcohol. The link between alcohol consumption and participation in team-oriented collegiate athletics needs to be clarified. Student-athletes appear to misuse alcohol more frequently than non-athletes, but it is not well understood what factors lay behind this phenomenon.

## **METHODS**

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The Athletic Involvement Study (of Students in a Northeastern University in the United States; hereafter AIS) was conducted at a large public university to explore how or if participation in sports affects health-risk behavior (Miller 2006). Funded by the United States Department of Health and Human Services, National Institutes of Health, and National Institute on Drug Abuse, a total of 795 undergraduates participated in the AIS, with a quarter not reporting any sport participation during high school or college. These undergraduates, all 18 years of age or older, were recruited from large-section, lower-level Sociology, Communications, and Economics courses. This purposive sample sought variation by recruiting in general education courses across several majors; nevertheless, the AIS is a convenience sample, so its generalizability is unknown.

The paper examines misuse of alcohol; that is, reporting “usually” or “always getting drunk while drinking,” and the number of days per month that respondents had “5 or more drinks of alcohol in a row, within a couple of hours” (see frequency distributions in Table 1). The first indicator of alcohol misuse were responses to the question, “When you go out drinking, how commonly do you end up getting drunk?” This requires the respondent to judge how the amount of alcohol consumed on a night out affects his or her physical and mental state and behavior. Hence, the concept of “drunk” is subjective, yet it is also an illuminating self-assessment of a physiological effect. Response options ranged from “I rarely or never go out drinking” to “I always get drunk,” and to facilitate statistical analysis, this paper recoded “I usually get drunk” and “I always get drunk” to the positive binary value, and assigned responses of “I rarely or never go out drinking”, “I go out drinking, but rarely or never get drunk”, and “I sometimes get drunk” to the zero binary value.

The second indicator of alcohol misuse is binge drinking. Though this measure is problematic, since it does not account for body mass differences and leaves the timeframe ambiguous, it does possess a specificity that the first indicator does not. The AIS asked how many times in the past 30 days respondents consumed five or more drinks of alcohol in a row within a couple of hours. Calculating the midpoints for each step of the ordinal scale (each response accounted for a range of number of days), this paper used responses to generate a semi-continuous variable at the ratio level.

To explore the relationship between type of sport and its potential relationship with athletes’ alcohol consumption, this paper recoded responses to “What would you consider your PRIMARY sport – the one that has been MOST important to you personally?” This question was open-ended, with 34 different responses received. From the author’s personal participation in and observation of the qualitative difference between the sports that rely on teamwork and sports that require more individual control, combined with classifications from previous literature (Gage 2008), this paper designated sports as primarily individual or team sport (see Appendix 1). Only those respondents who had participated in an individual or team sport during the past 12 months were classified as team sport athletes or individual sport athletes. Means and standard deviations for independent and control variables appear in Table 2.

To explore more thoroughly the relationship between type of sport and alcohol consumption, nine sets of control variables were examined. First, because alcohol consumption affects males and females differently, it is important to make sure results are not being confounded by these physical differences. Second, because age determines the freedom to drink legally, it merits inclusion as a control variable. Third, because grade point average (GPA) indicates academic prioritization and potentially related alcohol consumption patterns, GPA joins the control variables employed.

Fourth, as discussed in the review of the literature, participation in sports has been associated with positive mental health, so to clarify the effect of sport participation on alcohol consumption behaviors, this paper accounts for this association. Using the Center for Epidemiologic Studies Depression Scale (CES-D), this paper can account for respondents' overall mental wellbeing. The CES-D is used to identify people who may be at risk for depression, and it has been shown to work well across wide age ranges with strong reliability and validity. The questions that were chosen to be analyzed from the CES-D in the AIS had an index alpha of .830. Respondents ranked how often in the past week they felt certain ways, using a four-point scale from "rarely or none of the time (less than 1 day)" to "all of the time (5-7 days)." Questions addressed levels of fearfulness, happiness, restless sleep, loneliness, extreme exhaustion, depressive feelings, and irritability. Appendix 2 lists all items that make up the CES-D index. The distribution of the CES-D index is moderately normal with a few high outliers, but these outliers do not significantly skew the measures of central tendency and spread.

Fifth, this paper controls for attitudes toward risky behaviors. An individual who likes to take risks will also be more likely to heavily drink than an individual who prefers to be more cautious. To control for this potential confounding variable, I created an index that includes nine Likert items about personal attitudes toward risky behaviors. The index alpha for these nine items is .825, which indicates that this index is reliable. Some items represented beliefs or feelings – "It is foolish to take risks," while others are meant to gauge respondents' own actions – "I frequently put myself in risky situations." Appendix 3 lists the items included in the risk index. The risk index had a normal distribution.

Sixth, analyses included race and ethnicity as control variables due to their relevance in the literature (e.g., Tewksbury *et al.* 2008). AIS asked respondents to indicate their race, with options including American Indian or Native American, Asian American or Pacific Islander, Black or African American, White or Caucasian, Mixed race, and Other (specify). A follow up question asked respondents if they "are of Hispanic or Latino descent." This paper developed dummy variables for Asian American or Pacific Islander, for Black or African American, for Hispanic or Latino, and for American Indian or Native American and Mixed race (the numbers in each of these two groups were low). The reference group was Non-Hispanic White or Caucasian.

Seventh, because of strong norms in many religions about alcohol use, this paper included control variables for religion. The AIS asked respondents to select the option that best describes their religion, from Catholic, Protestant (specify), Jewish, Muslim, Buddhist, No religion, and Other (specify). A follow up question asked respondents to indicate if they would describe themselves as religious fundamentalists or evangelicals. Control variables were created for both questions. (They do not appear on the regression tables as both were consistently insignificant and ultimately excluded from the analysis.)

Eighth, because of the potent effect that parents can have on their children's alcohol consumption, this paper controlled for students' place of residence. A question in the background section of the AIS asked respondents where they were currently living, with options including dormitory, parents' home, own house or apartment, fraternity/sorority house, and other place of current residency. Four dummy variables were created from this indicator: one for current residency in a dormitory, one for current residency in own house or apartment, one for current residency in a fraternity/sorority house, and one for other place of current residency. The reference group was students currently residing in parents' home. Collegiate culture, especially as represented in popular media and entertainment, is characterized by high levels of drinking and partying (Sperber 2000). It is reasonable to speculate that where a student lives affects his or her susceptibility to this collegiate culture.

Finally, because the education of one's mother and father indicates socioeconomic status, and socioeconomic status in turn affects drinking behaviors, this paper included controls for parental education. Weitzman and Kawachi (2000) found that students with more social capital had lower rates of

binge drinking than those with less social capital. Socioeconomic status was included in their analysis of the components of social capital in their study, and parents' educational attainment was used as a proxy for socioeconomic status. By contrast, Humensky found "higher parental education is associated with higher rates of binge drinking, marijuana and cocaine use in early adulthood" (2010). Therefore, by proxy, higher parental education and thus higher socioeconomic status are associated with higher rates of frequent heavy drinking. This paper included dummy variables for fathers and mothers with four year college degrees or higher.

The independent and control variables used in the regression analysis appear to be independent of one another (see Table 3). There are few correlations greater than .3 or less than -.3 between variables, which might indicate collinearity. The binary variable for sex (with male = 1) has a statistically significant and moderately strong correlation (.306) with the variable for score on the risk index, but this correlation is not quite high enough to arouse suspicion. There is a statistically significant, negative correlation between age and current residency in a dormitory (-.457), which makes sense given the fact that the youngest students on a college campus are those given housing in dorms. The statistically significant correlation between age and current residency in own house or apartment (.426) is logical for the same reasoning; age is very strongly connected to where students are living. There is a statistically significant, negative correlation between current residency in a dormitory and current residency in own house or apartment (-.670). However, because these were both possible responses to the same question and students could only have chosen one for an answer, the variables are not measuring the same thing. Finally, there is a fairly strong, statistically significant, positive correlation between respondent's mother having at least a bachelor's degree and respondent's father having at least a bachelor's degree (.476). This follows logically because people often tend to marry those who are at similar levels of socioeconomic status as themselves, with socioeconomic status including occupation, educational attainment, and income.

## **FINDINGS**

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The results of logistic regression analysis (see Table 4) give a good deal of information about the different relationships at play. Neither individual sport athletes nor team sport athletes were, *ceteris paribus*, more likely to get drunk than their non-athlete peers. In addition, the relationships were negative, which is not what previous research would lead one to expect. This finding is intriguing. It appears that neither participation in an individual sport nor participation in a team sport make students any more likely to get drunk when drinking. The same applies for the ordinary least squares regression (see Table 5), which examined frequency of binge drinking in the past 30 days. Athletes had the same frequencies of binge drinking, *ceteris paribus*, as non-athletes. Since the extant literature indicates the opposite, one must look closely at other factors to see what is "explaining away" the well-established effect of college sport participation on alcohol consumption behaviors.

In the logistic regression model, the first control variable, sex, does not have a statistically significant relationship with frequency of getting drunk, meaning that males are no more likely than females to report usually or always getting drunk while drinking. This finding is also interesting given that the literature has established the relationship between sex and alcohol misuse. Second, the relationship between age and frequency of getting drunk is statistically significant and negative, meaning that older respondents are *less* likely to report usually or always getting drunk while drinking than younger respondents. Third, there is a highly significant relationship between risk index scores and frequency of getting drunk. The positive relationship here indicates that the higher a respondent's score on the risk index (strong agreement with statements condoning risky behavior or indicating involvement in risky behavior), the more likely the respondent is to report frequently getting drunk.

There is no statistically significant relationship between the CES-D index scores and the dependent variable, despite the well-documented relationship between mental health and alcohol use. Students' GPA is not statistically significant with frequency of getting drunk while drinking. However, three of the race indicators had statistically significant differences compared to the reference group: Asian American or Pacific Islander students, Black or African American students, and American Indian or Native American/Mixed race students are all less likely than non-Hispanic White or Caucasian students

to report getting drunk frequently. Although the Hispanic/Latino dummy variable is not statistically significant, its relationship with the reference group is also negative.

There are several statistically significant relationships between place of residency and getting drunk frequently. Those who live in a dormitory are about 2 times as likely to report getting drunk frequently as students who live in their parents' home. Students who live in their own house or apartment are about 3 times as likely to report getting drunk frequently as students who live in their parents' home. Most striking of all are students whose current place of residency is a fraternity or sorority house: they are 19 times as likely as students who live in their parents' home to report getting drunk frequently. Finally, there is a statistically significant, positive relationship between respondent's mother having at least a bachelor's degree and getting drunk frequently. Students whose mothers have at least a bachelor's degree are 1.7 times as likely to get drunk frequently as students whose mothers have lower levels of education.

Linear regression results (see Table 5) examined how many of the past 30 days the respondent binge drank (i.e., five or more drinks in a row). Again, there were no statistically significant relationships between the paper's two independent variables (individual sport athletes or team sport athletes) and the dependent variable, frequency of binge drinking. In this model, age did not have a statistically significant relationship with frequency of binge drinking in the past 30 days. Score on the CES-D index and the Hispanic/Latino dummy variable for race each were insignificant in this model as well.

Results from regression of frequency of binge drinking show males binge drink about 2 days more per month than females. A one-point increase in score on the risk index, moreover, indicates about 3 days more of binge drinking in the past 30 days. Not surprisingly, a higher college GPA is associated with fewer days of binge drinking. Asian American or Pacific Islander students, Black or African American students, and American Indian or Native American/Mixed race students binge drink, on average, about 2 to 4 days less than their non-Hispanic White or Caucasian counterparts. There were also significant relationships between place of residency and frequency of binge drinking in the past 30 days: students living in their own house or apartment reported binge-drinking 2.5 days more than students living in their parents' home, while those who live in fraternity or sorority houses reported binge drinking 11.2 days more than those whose current place of residency is their parents' home. The latter is particularly striking, considering this is 11 days more out of the past 30 days. Finally, there were no statistically significant relationships between parents' educational attainment and frequency of binge drinking in the past 30 days.

## **CONCLUSION**

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These results do not support the paper's hypothesis. However, these results substantially improve upon the current state of knowledge regarding what contributes to the frequency of getting drunk and the frequency of binge drinking by college students. Though there is not a tangible, significant difference between type of sport and misuse of alcohol, these results have undermined the popular idea that college athletes misuse alcohol more than their non-athlete counterparts. The control variables explain the misuse. College students who condone and engage in risky behavior, for example, are more likely to misuse alcohol. They are also more likely to be athletes. The seeming link between athletes and alcohol misuse, then, is spurious. It is explained by propensity toward risk, along with sex, age, race, ethnicity, CES-D, GPA, place of residence, and parental education. And this has important implications for student life policy; scarce student life resources need to be directed to the dangers of risk behaviors and to the enforcement of residential student alcohol policies, for example, as these will reach the greatest number of students who misuse alcohol.

That students under the age of 21 report frequently getting drunk more often than students over 21 years of age opens the door to further research. What factors are at play that lead students who cannot legally drink to report frequently getting drunk more often than students who are of age? Subcultural norms on college campuses, as described in Sperber's *Beer and Circus* (2000), are prime possibilities. Physically living on or near campus, race, and possibly socioeconomic status are all factors that may influence participation in a culture that condones heavy drinking. Race had a consistently significant relationship with measures of heavy drinking; white students engage in the most frequent and heavy drinking. In addition, an individual's mother's educational attainment reveals that those students with

the most educated mothers, those likely to have higher socioeconomic statuses, engaged in frequent and heavy drinking more often than those with less educated mothers. Thus white, upper-middle class students, including those involved in athletics, could be establishing this campus norm of drinking frequently and heavily. This finding alone merits future research. And if this is the case, then being a student of color or of low socioeconomic status may mean occupying the margins of collegiate culture.

Also fascinating is the powerful influence of residency in a fraternity or sorority house on drinking behavior, even when numerous factors known to be relevant to drinking behavior are held constant. More information regarding students' place of living would have been helpful, of course. Knowing whether Greek houses are on campus or off campus could help guide residential student policy recommendations. In addition, knowing more about where students are living, including what students mean by responding that they live in their own house or apartment, could also strengthen strategies targeting alcohol consumption behavior. The difference between on campus and off campus has important implications. Future research might focus on incoming freshmen, to see how they adapt to the collegiate drinking culture. A test-retest method could discern this possibility, surveying students upon entry to a college campus and then re-surveying at a later point. Clarifying whether an individual's primary sport is in season might have been helpful, too. Athletes take better care of their health when they are in their playing season and wish to perform at their fullest potential. Alternatively classifying sports as either contact or non-contact sports might have yielded potentially revealing results.

The bottom-line, though, is clear: college athletes do not misuse alcohol any more, or any less, than college students in general. Misuse is highest, rather, among fraternity and sorority residents, among white and upper-middle class students, among those with a high propensity for risk behaviors, and among underage college students. Educators and higher education administrators should focus attention on misuse of alcohol among these subgroups in particular.

Table 1: Frequency Distribution of Dependent Variables

Indicator	Percentage
<b>Getting Drunk When Going Out Drinking</b>	
I rarely or never go out drinking	21.4%
I go out drinking, but rarely or never get drunk	14.8%
I sometimes get drunk	27.8%
I usually get drunk	27.5%
I always get drunk	8.0%
Total	100.0%
N	791
<b>Number of Days in the Past 30 Days in which Respondent had "5 or more drinks of alcohol in a row, within a couple of hours"</b>	
Never in my life	15.8%
0 days	20.1%
1-2 days	18.3%
3-5 days	16.7%
6-9 days	15.8%
10-19 days	10.4%
20-29 days	2.4%
All 30 days	0.6%
Total	100.0%
N	792

Source: Miller, Kathleen. 2006. Athletic Involvement Study (of Students in a Northeastern University in the United States) [MRDF]. Buffalo, NY: Kathleen Miller, University of Buffalo [producer]. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2013-04-30. <http://doi.org/10.3886/ICPSR33661.v1>.



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Table 2: Descriptive Statistics for All Independent and Control Variables

<b>Variable name</b>	<b>Mean</b>	<b>Standard deviation</b>
Sex	.52	.50
Age	19.92	1.52
College GPA	2.95	.54
Asian American or Pacific Islander	.11	.32
Black or African American	.10	.30
American Indian, Native American, Mixed race	.08	.26
Hispanic or Latino	.08	.27
Current residency in a dormitory	.51	.50
Current residency in own house or apartment	.30	.46
Current residency in a fraternity/sorority house	.01	.09
Other place of current residency	.02	.14
Mother has at least a bachelor's degree	.40	.49
Father has at least a bachelor's degree	.48	.50
Current primary sport, individual	.06	.23
Current primary sport, team	.24	.43
<i>CES-D index</i>	1.97	.56
CES-D: bothered by things that usually don't bother me	1.77	.85
CES-D: trouble keeping mind on what I was doing	2.33	.91
CES-D: depressed	1.78	.93
CES-D: everything was an effort	1.99	.94
CES-D: fearful	1.63	.85
CES-D: sleep was restless	2.10	.99
CES-D: happy	2.01	.81
CES-D: lonely	1.86	.93
CES-D: could not get going	1.92	.89
<i>Risk index</i>	2.51	.44
Risk: I'm happiest when risking danger	1.93	.73
Risk: I prefer to be safe and careful	2.10	.68
Risk: I enjoy taking risks	2.59	.70
Risk: I take risks	2.71	.69
Risk: In general, I do not like risky situations	2.35	.70
Risk: I never take chances	3.02	.60
Risk: It is foolish to take risks	2.89	.67
Risk: I frequently put myself in risky situations	2.05	.69
Risk: I hate any kind of risk	2.98	.69

Source: Miller, Kathleen. 2006. Athletic Involvement Study (of Students in a Northeastern University in the United States) [MRDF]. Buffalo, NY: Kathleen Miller, University of Buffalo [producer]. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2013-04-30. <http://doi.org/10.3886/ICPSR33661.v1>.

Table 3: Bivariate Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	1.000																
2	.044	1.000															
3	.306*	-.030	1.000														
4	-.016	.044	.046	1.000													
5	-.184*	-.069	-.141*	-.103*	1.000												
6	-.001	.004	-.083*	.058	-.034	1.000											
7	.002	.029	-.087*	.053	-.124*	-.118*	1.000										
8	.053	.069	.023	-.022	-.019	-.102*	-.094*	1.000									
9	-.047	-.006	-.073*	.115*	-.072*	-.103*	-.095*	-.083*	1.000								
10	-.030	-.457*	.003	-.012	.047	.035	.004	-.070*	.077*	1.000							
11	.014	.426*	.001	.058	-.048	.031	.048	.111*	-.006	-.670*	1.000						
12	.063	.014	.053	-.009	-.059	.051	-.031	-.027	.023	-.096*	-.062	1.000					
13	.002	.057	.009	-.036	-.024	.009	.016	.030	-.040	-.141*	-.092*	-.013	1.000				
14	.079*	-.087*	.078*	-.139*	.055	-.115*	-.046	.009	-.044	.014	-.067	.033	.018	1.000			
15	.035	-.074*	.077*	-.054	.063	-.136*	-.079*	.060	-.030	-.013	.016	.018	.053	.476*	1.000		
16	.078*	-.020	.061	-.066	-.014	-.070*	-.044	-.027	.058	.041	-.064	-.023	.007	.048	.054	1.000	
17	.139*	-.046	.116*	-.085*	.033	-.052	-.027	-.047	-.022	.022	-.019	-.021	-.035	.084*	.003	-.136*	1.000

\*: p < .05

Source: Athletic Involvement Study (of Students in a Northeastern University in the United States), 2006

1 = Sex (Male = 1)

2 = Age (in years)

3 = Risk index: feelings and self-reported actions regarding risk taking (values range from 9-36, with high scores indicating strong agreement with statements condoning risky behavior or indicating involvement in risky behavior and low scores indicating disagreement with such statements)

4 = CES-D index: mental health assessment (values range from 9-36, with high scores indicating many days during the past week with feelings of hopelessness, uneasiness, sadness, weariness, etc. and low scores indicating few days with such feelings)

5 = College GPA

6 = Race – Asian American or Pacific Islander (1)

7 = Race – Black or African American (1)

8 = Race – American Indian or Native American and Mixed race (1)

9 = Race – Hispanic or Latino (1)

10 = Current residency in a dormitory (1)

11 = Current residency in own house or apartment (1)

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14 = Mother has at least a bachelor's degree (1)

15 = Father has at least a bachelor's degree (1)

16 = Current primary sport, individual sport (1)

17 = Current primary sport, team sport (1)

Table 4: Logistic regression coefficients of selected independent variables on self-reported heavy dr

	Equation 1: [Controls Only]		Equation 2	
	<i>b</i>	<i>Odds ratio</i>	<i>B</i>	<i>O</i>
Sex (male = 1)	.197	1.218	.218	
Age (in years)	-.227*	.797	-.229*	
Risk index	1.055*	2.872	1.070*	
CES-D index	.018	1.019	.002	
College GPA	-.290	.748	-.284	
Race - Asian American or Pacific Islander (1) <sup>a</sup>	-1.290*	.275	-1.306*	
Race - Black or African American, non-Hispanic (1) <sup>a</sup>	-2.229*	.108	-2.236*	
Race - American Indian or Native American, mixed race (1) <sup>a</sup>	-.856*	.425	-.878*	
Race - Hispanic or Latino (1) <sup>a</sup>	-.467	.627	-.454	
Current residency in a dormitory (1) <sup>b</sup>	.766*	2.150	.764*	
Current residency in own house or apartment (1) <sup>b</sup>	1.018*	2.766	1.010*	
Current residency in a fraternity/sorority house (1) <sup>b</sup>	2.977*	19.623	2.933*	
Other place of current residency (1) <sup>b</sup>	1.129	3.092	1.123	
Mother has at least a bachelor's degree (1)	.521*	1.683	.529*	
Father has at least a bachelor's degree (1)	-.248	.781	-.253	
Current primary sport, individual sport (1) <sup>c</sup>	---		-.212	
Current primary sport, team sport (1) <sup>c</sup>	---		-.119	
N	725		725	
Nagelkerke R square	.237		.237	

Source: Athletic Involvement Study (of Students in a Northeastern University in the United States),

Note: *b* = unstandardized coefficient; *Beta* = standardized regression coefficient.

- a. Compared to White or Caucasian, non-Hispanic
- b. Compared to current residency in parents' home
- c. Compared to no primary sport

\*:  $p < .05$  (two-tailed tests)

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Table 5: Ordinary least squares regression coefficients of selected independent variables on frequency of binge drinking in the past 30 days

	Equation 1: [Controls Only]		Equation 2	
	<i>B</i>	<i>Beta</i>	<i>B</i>	<i>Beta</i>
Sex (male = 1)	1.846*	.152	1.939*	.160
Age (in years)	-.122	-.031	-.126	-.032
Risk index	2.782*	.200	2.856*	.206
CES-D index	.388	.036	.328	.030
College GPA	-.904*	-.080	-.880*	-.078
Race - Asian American or Pacific Islander (1) <sup>a</sup>	-2.618*	-.130	-2.695*	-.134
Race - Black or African American, non-Hispanic (1) <sup>a</sup>	-4.075*	-.204	-4.118*	-.206
Race - American Indian or Native American, mixed race (1) <sup>a</sup>	-2.658*	-.114	-2.742*	-.118
Race - Hispanic or Latino (1) <sup>a</sup>	.379	.016	.456	.020
Current residency in a dormitory (1) <sup>b</sup>	.956	.079	.947	.078
Current residency in own house or apartment (1) <sup>b</sup>	2.500*	.191	2.452*	.188
Current residency in a fraternity/sorority house (1) <sup>b</sup>	11.426*	.184	11.230*	.181
Other place of current residency (1) <sup>b</sup>	1.165	.026	1.108	.025
Mother has at least a bachelor's degree (1)	.457	.037	.505	.041
Father has at least a bachelor's degree (1)	.032	.003	.013	.001
Current primary sport, individual sport (1) <sup>c</sup>	---		-1.146	-.043
Current primary sport, team sport (1) <sup>c</sup>	---		-.549	-.039
Constant		.237		.346
Adjusted R Square		.197		.198

Source: Athletic Involvement Study (of Students in a Northeastern University in the United States), 2006

Note: b = unstandardized coefficient; Beta = standardized regression coefficient.

a. Compared to White or Caucasian, non-Hispanic

b. Compared to current residency in parents' home

c. Compared to no primary sport

\*:  $p < .05$  (two-tailed tests)

## Appendix 1: Sport Classification

<b>Sport</b>	<b>Classification of Sport</b>
NA: No Primary Sport	None
Badminton	Individual
Baseball	Team
Basketball	Team
Bowling	Individual
Boxing or martial arts	Individual
Cheerleading or spirit squad	Team
Cross country	Individual
Dance team	Team
Equestrian	Individual
Field hockey	Team
Figure skating	Individual
Football	Team
Golf	Individual
Gymnastics	Individual
Ice hockey/Roller hockey	Team
Lacrosse	Team
Rugby	Team
Skiing	Individual
Soccer	Team
Softball	Team
Swimming or diving	Individual
Tennis/Racquetball	Individual
Track and field	Individual
Volleyball	Team
Wrestling	Individual
Snowboarding	Individual
Weightlifting	Individual
Handball	Team
Rowing/Crew	Team
Cricket	Team
Ping pong	Individual
Color/Winterguard	Team
Other sport	None

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Appendix 2: Questions making up the CES-D index

Question	Possible Responses - During the past week...
I was bothered by things that usually don't bother me.	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)
I had trouble keeping my mind on what I was doing.	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)
I felt depressed.	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)
I felt that everything I did was an effort.	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)
I felt hopeful about the future.	Rarely or none of the time/less than 1 day (4), some or a little of the time/1-2 days (3), occasionally or a moderate amount of time/3-4 days (2), all of the time/5-7 days (1)
I felt fearful.	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)
My sleep was restless.	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)
I was happy.	Rarely or none of the time/less than 1 day (4), some or a little of the time/1-2 days (3), occasionally or a moderate amount of time/3-4 days (2), all of the time/5-7 days (1)
I felt lonely.	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)
I could not "get going."	Rarely or none of the time/less than 1 day (1), some or a little of the time/1-2 days (2), occasionally or a moderate amount of time/3-4 days (3), all of the time/5-7 days (4)

Note number values assigned to responses in parentheses. A score of 40 (10 responses of 4) would indicate many days during the past week with feelings of hopelessness, uneasiness, sadness, weariness, etc.; low scores (e.g., a score of 10 which equates to 10 responses of 1) indicate few days with such feelings.

Appendix 3: Questions that make up the risk index

<b>Question</b>	<b>Possible Responses</b>
I am happiest when I'm risking danger.	Strongly disagree (1), disagree (2), agree (3), strongly agree (4)
I prefer to be safe and careful.	Strongly disagree (4), disagree (3), agree (2), strongly agree (1)
I enjoy taking risks.	Strongly disagree (1), disagree (2), agree (3), strongly agree (4)
I take risks.	Strongly disagree (1), disagree (2), agree (3), strongly agree (4)
In general, I do not like risky situations.	Strongly disagree (4), disagree (3), agree (2), strongly agree (1)
I never take chances.	Strongly disagree (4), disagree (3), agree (2), strongly agree (1)
It is foolish to take risks.	Strongly disagree (4), disagree (3), agree (2), strongly agree (1)
I frequently put myself in risky situations.	Strongly disagree (1), disagree (2), agree (3), strongly agree (4)
I hate any kind of risk.	Strongly disagree (4), disagree (3), agree (2), strongly agree (1)

Note number values assigned to responses in parentheses. A score of 36 (9 responses of 4) would indicate strong agreement with statements condoning risky behavior or indicating involvement in risky behavior; low scores (e.g., a score of 9 which equates to 9 responses of 1) indicate disagreement with such statements.



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