Published in final edited form as:

Drug Alcohol Depend. 2011 July 1; 116(1-3): 242–245. doi:10.1016/j.drugalcdep.2010.12.013.

Alcohol consumption associated with collegiate American football pre-game festivities

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Abstract

Internationally, sporting events represent a specific context in which heavy episodic drinking is common. The current study assessed determinants of heavy episodic drinking among tailgaters (i.e., individuals engaging in pre-game social festivities) prior to American football games at two large universities. A total of 466 individuals at two universities completed a short interview and provided a breathalyzer sample to estimate breath alcohol content (BrAC) during the tailgating window (150 minutes prior to and 10 minutes after the start of the game). The plurality of participants, 48.5% at the Southeastern University (School1) and 58.8% at the Midwestern University (School2), engaged in heavy episodic drinking. Only 54 individuals (11.6%) from the combined sample at both universities abstained from alcohol (confirmed via BrAC). In total, 40.2% of participants at School1 and 31.9% at School2 produced breath samples over the legal limit for driving (i.e., BrAC = 0.08 or higher). In site-specific regression analyses, younger ages, males, and non-students at School1, and younger ages and non-game attendance at School2 were associated with self-reported heavy episodic drinking and higher levels of estimated BrAC ($p < 0.05$). Given the widespread participation in heavy episodic drinking among both students and

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Conflict of Interest

All authors declare they have no conflicts of interest.

Contributors

Lisa J. Merlo designed the study and wrote the initial protocol, conducted initial statistical analyses, and wrote the first draft of the manuscript. Brian K. Ahmedani conducted literature searches, the main statistical analyses, and assisted in the development of the research protocol. David A. Barondess and Kipling M. Bohnert assisted with the design of the study and development of the research protocol. Mark S. Gold developed the research question and provided funding for the breath testing equipment. All authors contributed to and have approved the final manuscript.

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non-students in this sample, public health interventions should be implemented both on- and off-campus to promote safety and to discourage heavy episodic drinking at American football games and other high-profile sporting events.

Keywords

Tailgating; Heavy Episodic Drinking; College Football; Alcohol; Sporting Events

1. Introduction

Heavy episodic drinking may lead to short- and long-term negative consequences (Harris et al., 2010; Jennison, 2004), and is common among sporting event spectators. Research has demonstrated high levels of alcohol use and associated consequences among spectators at American baseball games (Wolfe et al. 1998), Scottish professional football [soccer] matches (Crawford et al., 2001), and rugby matches in Wales (Moore et al., 2007), as well as among Irish (Mattick et al., 2003) and British (Deakin et al., 2007) fans watching World Cup football [soccer] matches on television. Prior research has also suggested that high-profile events are associated with heavier drinking than lower-profile events (Neal et al., 2005).

Recent studies have suggested that collegiate American football games, in particular, represent a significant risk for heavy episodic drinking and related criminal activity, especially at universities where football success is highly-valued (Glassman et al., 2007; Neal and Fromme, 2007; Nelson and Wechsler, 2003; Merlo et al., 2010). While many American football fans are not affiliated with the universities, most studies have focused only on student alcohol consumption. Furthermore, prevention efforts have typically been limited to programs for the campus community. In order to assess the need for broader prevention/intervention programs, the goal of this study was to compare characteristics of individuals who drink alcohol or engage in heavy episodic drinking during American collegiate football tailgating events (i.e., pre-game social festivities typically involving food and alcohol that occur near the stadium). This is the first study measuring alcohol consumption by both self-report and breath alcohol content (BrAC), among students and non-students, at two different universities. We hypothesized that 1) heavy episodic drinking would be prevalent among tailgaters, 2) alcohol consumption would be greater among students than non-students, and 3) men would display higher levels of alcohol consumption than women.

2. Materials and Methods

All procedures were approved by the Institutional Review Boards at two universities, geographically located in the Southeastern (School1; n=258) and Midwestern (School2; n=208) United States. The two schools were selected due to their membership in major collegiate American football conferences, large student bodies (>40,000), and large average game attendances (>70,000). Individuals participating in tailgating were sampled with respect to their alcohol consumption during a time window (150 minutes prior to and 10 minutes after game time). Tailgating is permitted anywhere on the campus, with students and non-students intermixing to set up tables, chairs, tents, radios/televisions, barbeque grills, and picnic supplies.

To recruit participants, two groups of three trained research assistants approached individuals from among the tailgating crowds on each campus (i.e., two games in 2008 at School1; three games in 2009 at School2). At least one research team at each game included

a senior researcher (i.e., study co-author). The research teams began in the middle of the campus and split up to cover the primary tailgating areas. Researchers proceeded in a linear fashion, inviting each individual they encountered to participate. Only individuals under the age of 18 were excluded from the study, due to their inability to provide consent.

After introducing themselves to the potential participants, the researchers briefly described the study procedures and asked individuals if they were interested in participating. Participation entailed a three-step process to ensure confidentiality of responses: 1) consent to participation with the first researcher, 2) complete a short verbal survey with the second researcher, and 3) provide a breath sample to the third researcher. The entire procedure required approximately 8–10 minutes. Refusals were recorded at the point the person declined to participate. In order to prevent competition amongst participants with regard to alcohol consumption, participants were not informed of their exact BrAC level. They were informed if they were ‘over’ or ‘under’ the legal driving limit (i.e., 0.08) if the information was requested.

For the survey, participants were asked single-response questions assessing sex (male/female), race/ethnicity (Asian, African American/Black, Caucasian...), student (e.g., freshman...graduate/professional) or employment status (e.g., full-time...unemployed), and game attendance plans (attending/not attending). All options were verbally presented for each category before participants responded. Free response items assessed age and “estimated alcohol consumption.” After showing a drink equivalency chart (i.e., one 12 oz beer = 1 drink, etc), participants reported the number of drinks they consumed on game day prior to assessment. The same Intoximeter Alco-Sensor IV machines were used to estimate breath alcohol content (BrAC) at both schools.

2.1. Data Analysis

Means and frequencies were computed for demographic variables, self-reported alcohol consumption, and estimated BrAC. The correlation between self-reported alcohol consumption and BrAC was calculated using Pearson *r*. Men who reported consuming five or more drinks, and women who reported consuming four or more drinks, were categorized as ‘heavy episodic drinkers’ (National Institute on Alcohol Abuse and Alcoholism, 2004; Wechsler et al., 1995). Individuals whose breath samples were at least 0.08 were considered over the legal driving limit. The main regression analyses assessed both self-reported heavy episodic drinking and BrAC, adjusting for age, sex, game attendance, and student/employment status.

3. Results

Table 1 provides the demographic characteristics of the two samples. Approximately 73% of individuals approached at School1 and 75% at School2 agreed to participate. Researchers did not notice any consistent pattern among study refusers with regard to age, gender, ethnicity or visible evidence of drinking status. However, participants were primarily male, non-Hispanic white/Caucasian, and non-students. Participant ages ranged from 18–71 years, and most participants planned on attending the game. Overall, 48.5% of participants at School1 and 58.8% at School2 reported heavy episodic drinking. A total of 54 individuals (11.6%), at both sites combined, abstained from drinking. On average, participants reported having 4.8 drinks at School1 and 5.3 drinks at School2. The mean estimated BrAC was 0.07 at School1 and 0.06 at School2. In addition, 40.2% of participants at School1 and 31.9% at School2 had BrAC levels at or over the legal driving limit. Self-reported alcohol consumption was significantly correlated with estimated BrAC [$r(460) = 0.60, p < 0.05$]. The highest recorded BrAC levels at School1 and School2 were 0.31 and 0.29, respectively. Over 32% of those under age 21 reported consuming at least one drink.

In the logistic and generalized linear model regression analyses (Table 2; Panels A & B, respectively), heavy episodic drinking and BrAC levels were assessed with covariate adjustment for sex, age, student status, and game attendance. The results indicated that males, younger ages, and non-students were associated with heavy episodic drinking and higher levels of BrAC at School1. There were no differences in alcohol consumption and BrAC based on game attendance plans at School1. The regression results differed slightly for School2. Heavy episodic drinking and higher levels of BrAC were still associated with younger ages, but there were no differences based on sex or student/employment status. In contrast to School1, those who anticipated attending the game were at decreased odds for heavy episodic drinking and had lower levels of BrAC.

4. Discussion

Consistent with previous research (Neighbors et al., 2006) the majority of participants reported consuming alcohol during collegiate American football tailgating, with the plurality of participants reporting heavy episodic drinking. The proportion of heavy episodic drinkers was much greater during tailgating than the yearly proportions observed during 2009 in the states where School2 (17.1%) and School1 (13.3%) are located (Centers for Disease Control and Prevention, 2010). At both sites, younger age was associated with heavy episodic drinking; although it is noteworthy that 92.7% of the sample had reached the legal drinking age. Conceptually, university activities may seem to be student-dominated; however, football games at major universities are not, as depicted by the non-student/student ratio represented in this sample, and in other research (Glassman et al., 2007). It was anticipated that being male would be associated with heavy episodic drinking, which was the case at School1, but not at School2. This suggests that women may also engage in high levels of drinking during tailgating. Contrary to expectations, the levels of heavy episodic drinking were higher for non-students than for students at School1, although there were no differences at School2. In addition, it is noteworthy that levels of heavy episodic drinking were higher among tailgaters who did not plan to attend the football game at School2, suggesting a greater likelihood that those individuals would engage in driving while impaired (since they would not be sitting “safely” in the stadium for the length of the game after tailgating).

The BrAC levels observed among participants were also important, as almost one-third of the sample at School2, and over 40% at School1, were over the legal driving limit. Indeed, the range of observed BrAC levels included unsafe maximum levels as high as 0.31 at School1 and 0.29 at School2. These findings represent a snapshot view of alcohol consumption among many individuals over a short period, and do not necessarily represent their peak levels, which may be underestimated. These results extend previous research documenting that sporting events are associated with excessive alcohol consumption (Glassman et al., 2007; Neal and Fromme, 2007; Nelson and Wechsler, 2003; Neighbors et al., 2006; Wolfe et al., 1998; Crawford, et al., 2001; Moore et al., 2007; Mattick et al., 2003; Deakin et al., 2007) by employing field observations that were empirically verified by measurement of BrAC and self-report.

The differences found between the two schools may be due to a variety of factors, including geographic location/cultural norms, weather patterns, and possible police presence. Also, campus drinking policies may have been influential, as tailgating is prohibited until five hours before day games and seven hours before night games at one site, and these policies are not in place at the other. Tailgating is allowed on the whole campus at both sites, but specific areas are designated for these activities. These areas may vary between sites as to their distance from stores for additional alcohol purchases.

4.1. Limitations

Several limitations of the present study should be noted. Data were collected at two universities with high-profile football programs; therefore, the findings may not be generalizable to other settings. Nonetheless, this is the first study to compare samples from two universities with respect to alcohol use among tailgaters. Although no differential patterns were observed, it is unknown whether there were systematic differences between the individuals who agreed to participate and those who refused. The convenience sampling strategy may have resulted in selection bias. Nevertheless, due to the large numbers of people that congregate in small areas and constant crowd movement, more sophisticated sampling strategies would have been difficult to implement. The use of self-report to assess alcohol consumption may have introduced recall bias; however, this potential limitation was minimized via the use of complementary BrAC data. The use of a breathalyzer soon after an individual had a drink may have unintentionally measured mouth alcohol levels that could be higher than the actual BrAC (see, Watterson and Ellefsen, 2009). To minimize this potential confounder, individuals were asked to agree to participate and complete the survey before providing their breath sample. Study activities were sequenced to provide sufficient time between an individual's last drink and their breath sample (~8–10 minutes). Finally, the intention of this study was to assess race/ethnicity as a covariate in the analysis; however, the small sample sizes in categories other than white/Caucasian (non-Hispanic) minimized the ability to make inferences. When the race/ethnicity variable was included in the analysis, null results were produced for each category, prompting its removal.

4.2. Conclusions

Within the context of these limitations, the findings have important implications for public health. Given the high levels of alcohol consumption observed, more effort is needed to decrease heavy episodic drinking at tailgating activities. This should include implementation of both on- and off-campus prevention programs, which may also be extended to professional sporting events (e.g., baseball, rugby, basketball, etc.). Future research should attempt to replicate this study on other campuses, with larger samples, and at professional sporting events. Studies should also examine game-related factors that might be associated with more problematic levels of heavy episodic drinking such as day vs. night games and pre- vs. post-game activities, expanding this work and that of Neal and Fromme (2007). Finally, research is needed to assess the impact of interventions developed to curb heavy episodic drinking associated with sporting events.

Acknowledgments

The authors wish to thank the field assistants for their role in this research.

Role of Funding Source

Lisa J. Merlo was supported in part by National Institute of Drug Abuse (NIDA) training grant T32-DA-07313-10 (PI: Linda B. Cottler). Brian K Ahmedani and David A. Barondess were supported by T32-DA-021129. Kipling M. Bohnert was supported by F31-DA-021040. The NIDA had no further role in study design; in the collection, analysis and interpretation of the data; in the writing of the report; or in the decision to submit the paper for publication.

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Table 1

Demographic characteristics of a sample of college football tailgaters at two large Universities; geographically located in the Southeast (School1: n=258) and Midwest (School2: n=208) United States.

Panel A	School1	School2
	% (n)	% (n)
Sex		
Female	43.6 (112)	43.6 (88)
Male	56.4 (145)	56.4 (114)
Race/Ethnicity		
White/Caucasian (non-Hispanic)	82.6 (213)	93.8 (195)
Black/African American (non-Hisp.)	1.6 (4)	1.9 (4)
Hispanic	9.7 (25)	3.4 (7)
Other	3.9 (10)	1.0 (2)
Student Status		
Non-student	53.1 (137)	65.7 (136)
Undergraduate	25.6 (66)	25.6 (53)
Graduate/professional	21.3 (55)	8.7 (18)
Plan to Attend Game		
Yes	71.3 (174)	71.2 (121)
No	28.7 (70)	28.8 (49)
Heavy Episodic Drinking (5+ males; 4+ females)		
Yes	48.5 (125)	58.8 (120)
No	51.6 (133)	41.2 (84)
BrAC Legal Driving Limit (0.08)		
Under	59.8 (153)	68.1 (141)
At or Over	40.2 (103)	31.9 (66)

Panel B	School1	School2		
	M (sd)	Min., Max.	M (sd)	Min., Max.
Age	28.6 (10.5)	18, 71	32.1 (11.9)	18, 68
Est. Breath Alcohol Content (BrAC)	0.07 (0.07)	0, 0.305	0.06 (0.05)	0, 0.288
Est. # Alcohol Drinks Game Day	4.8 (4.3)	0, 25	5.3 (3.7)	0, 18

Table 2

Logistic regression of self-reported heavy episodic drinking (Panel A) and general linear model of estimated breath alcohol content (Panel B) with covariate adjustment for sex, age, student status, and plan to attend the game among samples of college football tailgaters at two large universities; geographically located in the Southeast (School1: n=258) and Midwest (School2: n=208) United States.

Panel A	School1				School2			
	OR (SE)	p-value	95% CI	OR (SE)	p-value	95% CI		
Male (female=ref.)	3.46 (1.03)	<0.001	1.93, 6.20	1.85 (0.64)	0.075	0.94, 3.67		
Age	0.95 (0.02)	0.002	0.92, 0.98	0.95 (0.01)	0.002	0.92, 0.98		
Non-students (ref.)								
Graduate/Professional	0.21 (0.08)	<0.001	0.10, 0.44	1.66 (1.11)	0.453	0.44, 6.18		
Undergraduate	0.16 (0.06)	<0.001	0.10, 0.35	0.69 (0.32)	0.435	0.28, 1.73		
Attending game (not=ref.)	1.83 (0.60)	0.067	0.96, 3.47	0.39 (0.16)	0.024	0.18, 0.88		
Panel B	School1				School2			
	β (SE)	p-value	95% CI	β (SE)	p-value	95% CI		
Male (female=ref.)	0.04 (0.01)	<0.001	0.02, 0.05	0.01 (0.01)	0.194	-0.005, 0.02		
Age	-0.001 (0.0004)	0.003	-0.002, -0.0004	-0.001 (0.0003)	0.002	-0.002, -0.0004		
Non-students (ref.)								
Graduate/Professional	-0.04 (0.01)	<0.001	-0.06, -0.01	-0.01 (0.01)	0.286	-0.03, 0.01		
Undergraduate	-0.03 (0.01)	0.002	-0.05, -0.01	0.02 (0.01)	0.114	-0.01, 0.05		
Attending game (not=ref.)	0.002 (0.01)	0.811	-0.02, 0.02	-0.03 (0.16)	0.002	-0.04, -0.01		