Hook 'Em Horns and Heavy Drinking: Alcohol Use and Collegiate Sports

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Abstract

Heavy alcohol consumption has been associated with collegiate sporting events, but little is known about specific levels of consumption over the course of an entire sports season. Ongoing web-based daily-monitoring at the University of Texas at Austin allowed assessment of drinking levels of students ($n = 541$) over two full football seasons. High-profile football game days were among the heaviest days for alcohol consumption, comparable to consumption on other well-known drinking days such as New Years Eve and Halloween weekend. Men increased their drinking for all games, and women with greater social involvement were more likely to drink heavily during away games. Among lighter drinkers, away games were associated with a greater likelihood of behavioral risks as intoxication increased.

Emerging adult college students are among the heaviest drinking demographic groups in the United States. Those who attend college consume considerably more alcohol than their noncollege peers (Johnston, O'Malley, Bachman, & Schulenberg, 2005), and they experience high rates of negative consequences associated with excessive alcohol use (Wechsler, et al., 2002). Although examination of typical and peak consumption patterns can shed light on general patterns of college drinking, traditional assessments of alcohol consumption such as Quantity/Frequency indices (e.g., the Daily Drinking Questionnaire; Collins, Parks, & Marlatt, 1985) have significant limitations (e.g., Neal, et al., 2006). Such assessments require students to rely on heuristically-based estimates of "typical" consumption patterns, and are therefore unlikely to capture drinking episodes that are outside of individuals' normative consumption patterns.

Recent evidence suggests that collegiate drinking, and heavy drinking in particular, is often associated with specific social or recreational events within the college environment. Although these events may represent college students' heaviest drinking occasions, they are likely to be excluded by traditional quantity/frequency assessments of alcohol use. Thus, the identification of events that promote heavy drinking, the degree to which alcohol use increases in conjunction with these events, and factors that influence drinking during these events, has become a recent focus of empirical research. For example, although it has widely been considered a period of sustained heavy drinking for many students, only recently has drinking on Spring Break been empirically documented as a specific heavy drinking context (Lee, Maggs, & Rankin, 2006; Smeaton, Josiam, & Dietrich, 1998). Likewise, Halloween (Miller, Jasper, & Hill, 1993) has

been associated with increased rates of alcohol consumption, and recent investigations have documented heavy drinking practices on college students' twenty-first birthdays (Neighbors, Oster-Aaland, Bergstrom, & Lewis, 2006; Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom, 2005). Another drinking context, which is particularly relevant to a wide range of campuses across the country, is university-related sporting events.

Collegiate Sports and Alcohol Consumption

Whereas other heavy drinking contexts occur only once a year (Spring Break, Halloween) or once in a lifetime (twenty-first birthday), sporting events occur on a weekly basis throughout the academic year. Students who self-identify as sports fans endorse higher rates of heavy drinking compared to other students (Nelson & Wechsler, 2003), yet there exists only limited empirical evidence to suggest that heavy drinking occurs on days on which college sports teams play games. Many college students view campus sporting events as an opportunity for heavy drinking, both to celebrate important victories as well as to express solidarity and enhance group cohesion with fellow students (Rabow & Duncan-Schill, 1995). This latter finding emphasizes the fact that heavy drinking associated with sporting events may be linked both to the athletic event itself, as well as to the social context associated with the athletic event. Games days, like spring break, are viewed as "party days," in which a more disinhibited social atmosphere is likely to lead to increased alcohol use as well as other behavioral risks. As such, a large percentage of alcohol-related violations occur on college game days (Coons, Howard-Hamilton, & Waryold, 1995) which can be reduced by limiting the supply of alcohol (Bormann & Stone, 2001).

Only two studies have examined the rate of alcohol use associated with specific sporting events. Large increases in alcohol consumption were observed on the days of the semi-finals and finals of the National Collegiate Athletic Association (NCAA) Final Four basketball tournament (Neal, Sugarman, Hustad, Caska, & Carey, 2005). Over 60% of the sample reported alcohol consumption on each game day, and among those who drank, average consumption on the Saturday semi-final game was 8.2 (SD = 5.5) drinks and average consumption on the Monday final game was 6.9 (SD = 4.8) drinks. For comparative purposes, on a typical Saturday only 45% of the sample consumed alcohol, and average consumption was 3.2 drinks. Additionally, both decreased levels of impulse control and a wider range of drinking motives were associated with increased drinking on these occasions.

A second study examined rates of alcohol consumption relative to misperception of social norms associated with "tailgating" for college football games (Neighbors, et al., 2006). Over 75% of students reported drinking alcohol while tailgating, consuming an average of 3.8 (SD = 2.8) drinks. In general, heavier drinkers were more likely to drink, and drink heavily, when tailgating, and those students who overestimated how much their peers were drinking were also likely to consume greater quantities of alcohol. The authors of this study did not, however, compare rates of drinking during tailgating to rates of drinking in other contexts.

Summary and Purpose of the Current Study

Preliminary data suggest a strong link between specific campus sporting events and collegiate alcohol consumption, but there has been no study of drinking patterns across the duration of an entire sports season. Furthermore, no research exists on the link between sports-related drinking and alcohol-related behavioral risks, that is, whether drinking on game days leads to increased risk of negative behavioral outcomes due to intoxication. Such a potential link is critical, in that the environmental cues and social demands associated with football game days may enhance the association between alcohol intoxication and risk-taking. Finally, only social norms (Neighbors, et al., 2006), impulse control, and drinking motives (Neal, et al., 2005) have been demonstrated as significant predictors of game day drinking, despite the fact that the

social nature of sports-related drinking is endorsed by students as a primary reason for alcohol consumption (Rabow & Duncan-Shill, 1995).

Thus, the goal of this study was to address these two deficits in the literature on sports-related drinking. First, we provide data regarding consumption levels and behavioral risks over the course of two collegiate football seasons at The University of Texas at Austin (UT). These analyses clarify the general patterns of alcohol use on college game days relative to non-game days at a university where collegiate football is at the center of students' lives, and the shouts of "hook 'em horns" are immediately recognized as a symbol of support for the Texas Longhorns football team. Second, we examine theoretically-relevant predictors of game-day drinking. In particular, we test average consumption (i.e., how much a person typically drinks) and social involvement (i.e., amount of time typically spent with friends) as predictors of game-day drinking. Analyses of average consumption allows a test of whether only heavier drinkers are engaging in heavy drinking during football games, or whether football games serve as a catalyst for heavier drinking across the entire student population. Analyses of social involvement tests whether more socially-engaged individuals use sporting events as a context for heavy drinking with friends. These two variables are then used to predict the occurrence of behavioral risks after controlling for event-specific drinking.

We tested the following hypotheses: (1) alcohol consumption on football game days will be greater than consumption on non-game Saturdays; (2) heavier drinkers (relative to lighter drinkers) and individuals with high social involvement (relative to those with low social involvement) will demonstrate significantly greater increases in drinking on football game days; (3) sporting events will serve as a moderator of the association between alcohol consumption and behavioral risks; in particular, football game days will be associated with a greater likelihood of behavioral risks as intoxication increases relative to non-game days; and (4) football game days will serve as a moderator of the association between alcohol consumption, social involvement, and behavioral risks, such that those individuals with high social involvement will experience higher rates of behavioral risks when intoxicated on game days.

Method

Participant Recruitment and Sample Composition

Data for this study were taken from an ongoing longitudinal research project at UT (The UT Experience!) that is examining alcohol use and behavioral risks from the end of high school through the four years of college. More details regarding this protocol can be found in Neal & Fromme (2007) and Neal, Corbin, & Fromme (2006). Participants ($n = 2,247$) were eligible to participate if they were first-time freshmen, unmarried, and between the ages of 17 and 19. Participants completed web-based surveys semiannually, as well as 30 days of daily self-monitoring beginning at a randomly assigned start date each year. Current analyses are based on the first two years of monitoring data, representing data collected during participants' Freshmen and Sophomore years of college.

For these analyses, the football season was defined as one week before the first game of the season until one week following the last game of the season. Thus, this time frame included two full football seasons. In each season a total of 13 games were played, including 11 home or away games (played on Saturdays), one game against a local Texas rival (played on the Friday following Thanksgiving) and the Rose Bowl game (played on Saturday, January 1 in 2005, and on Wednesday, January 4 in 2006; this latter game was for the National Championship). Over 85% ($n = 1,929$) of the overall sample have provided monitoring data, but participants' data were included in the analyses only if they provided data during the football season and reported at least one drinking occasion. The resulting sample ($n = 541$; 63% female,

59% Caucasian, 16% Hispanic, 15% Asian) provided a total of 19,273 days of daily monitoring during the two football seasons.

Measures

The *Demographic variables* of gender, ethnicity, and date of birth were assessed in the semiannual survey. Also assessed in the semiannual survey was social involvement (i.e., time spent with friends). This variable was assessed using a single item: "During an average week of the last three months, how many hours did you spend with your friends (outside of classroom or work)?" Responses were scored on a 0-4 scale, with 0=0 Hours, 1 = 1-5 hours, 2 = 6-10 hours, 3 = 11-20 hours, and 4 = 20+ hours. This variable had a mean of 2.8 (SD = 1.1; Min = 0; Max = 4).

The Daily Self-Monitoring Protocol began with a large sample of 200 individuals during the first week in order to ensure that a sufficient number of participants were engaging in self-monitoring during the first week of college. Thereafter, 40-43 participants started daily monitoring each week. Participants logged into our website, which gave a calendar with all days of monitoring on it. For each day, participants reported (1) the number of times they drank; (2) the number of standard drinks consumed; (3) the duration of the drinking episode (for multiple drinking episodes, the heaviest drinking episode was reported) and (4) Whether any of the following behavioral risks occurred: illicit drug use, drinking and driving, any sexual behavior, unsafe sexual behavior, victim of sexual coercion, perpetrator of sexual coercion, aggressive behavior, gambling, theft, and vandalism. These behavioral risks were collapsed into a single variable that indicated whether any risky behavioral event occurred. Behavioral risks were reported on 15.6% of all days, and 36.0% of drinking days. Overall, 79.7% of the sample reported at least one behavioral risk during the monitoring period. More information regarding these behavioral risks can be found in Neal & Fromme (2007).

Results

Descriptive drinking data

Descriptive statistics for alcohol consumption were computed for each day of the week, excluding days on which football games were played. Means for Friday drinking were 1.8 (SD = 3.4) drinks during the freshman year and 2.1 (SD = 3.6) drinks during the sophomore year, with 36.1% and 37.3%, respectively, reporting drinking on these days. Means for Saturday drinking were 1.6 (SD = 3.2) drinks during the freshman year and 1.8 (SD = 3.4) drinks during the sophomore year, with 32.7% and 33.7%, respectively, reporting drinking. The 10 heaviest drinking days for each of the two football seasons are presented in Table 1. Football game days were among the heaviest days for alcohol consumption, particularly for high-profile games against conference or national rivals. Consumption on game days was on par with other known heavy drinking contexts, including Halloween weekend and the last day of classes.

Patterns of drinking associated with football games were further examined using Generalized Estimating Equations (GEE; e.g., Hardin & Hilbe, 2003), a statistical technique for the analysis of longitudinal or repeated-measures data (e.g., data with daily observations nested within individuals). One significant benefit of the GEE framework is that it allows for specification of probability distributions other than the normal distribution; it can handle both dichotomous outcomes (e.g., logistic or binary outcomes) as well as positively skewed outcomes (e.g., Poisson, negative binomial, or gamma distributions), which is consistent with the current data. For the current analyses, the GEE models were specified with a negative binomial reference distribution. Day-of-week indicator variables estimated average alcohol consumption on each day, Saturday home and away games, local rivalry games played during Thanksgiving break, the 2005 Rose Bowl, and the 2006 Rose Bowl. Compared to a typical Saturday, game days

were associated with significantly heavier alcohol consumption ($b = 0.39$, $z = 3.70$, $p < .001$). Conversely, games played during Thanksgiving break were associated with less drinking than typical Fridays ($b = -0.83$, $z = 4.23$, $p < .001$). The 2005 Rose Bowl game had less consumption than a typical Saturday ($b = -0.43$, $z = 2.04$, $p = .042$), whereas the 2006 Rose Bowl game had significantly heavier consumption than a typical Wednesday ($b = .66$, $z = 3.10$, $p = .002$). Consumption on this day, however, did not exceed a typical Saturday ($z = 0.75$, $p = .45$), and was significantly less than drinking on a typical Saturday game day ($z = 2.38$, $p = .02$).

Analysis of Increased Drinking on Game Days

The next set of analyses were conducted to determine the association between game days and increases in alcohol consumption (i.e., how much a person consumed above their average amount, represented as person-centered drinks). Due to their infrequent (i.e., once a year) occurrences, the Rose Bowl games and the local Texas rivalry games were not included in these analyses. A GEE model treated days as nested within individuals, and was parameterized to include a day-of-week factor (Sunday – Saturday), a game status factor (home game, away game) gender, and the interactions of gender with game status. Results are presented by gender, and include only those marginal effects of relevance (i.e., non-game Saturdays, home games, and away games). For women, non-game Saturdays were associated with an average increase in drinking of 0.91, home games with an average increase in drinking of 0.97, and away games with an average increase in drinking of 1.19. Neither home games ($z = 0.41$, $p = .68$) nor away games ($z = 1.80$, $p = .07$) were associated with greater increases in drinking when compared to nongame Saturdays. For men, non-game Saturdays were associated with an average increase in drinking of 0.84, home games with an average increase in drinking of 1.93, and away games with an average increase in drinking of 1.74. Both home games ($z = 4.06$, $p < .0001$) and away games ($z = 2.93$, $p = .003$) were associated with greater increases in drinking.

Next, in order to determine the association between average consumption and increases in consumption on non-game Saturdays, home games, and away games, a second GEE model was implemented. This model was parameterized as described above; additionally, a main effect for average drinks, the two-way interactions of average drinks with day-of-week and game status, the three-way interaction of average drinks, day of week, and gender, and the three-way interaction of average drinks, game status, and gender, were included. The dependent variable in this model was person-centered daily drinks. For women, average drinks significantly predicted increased drinking on non-game Saturday drinking ($b = .86$, $z = 7.64$, $p < .001$). The regression slope for home game drinking was not significantly different than Saturday drinking, $z = 1.41$, $p = .16$. Conversely, the regression slope for away game drinking ($b = 1.31$, $z = 6.51$, $p < .001$) was significantly greater than non-game Saturdays, $z = 2.17$, $p = .03$. Thus heavier drinking women were likely to increase their drinking equally for both non-game Saturdays and home games, but increased their drinking by a greater amount during away games. These regression lines are represented in Figure 1. For men, average drinks significantly predicted non-game Saturday drinking ($b = .99$, $z = 3.39$, $p < .001$). The regression slope for home game drinking was not significantly different than Saturday drinking, $z = 0.77$, $p = .44$, nor was the slope for away game drinking, $z = 0.52$, $p = .61$. Thus men were likely to increase their drinking equally for non-game Saturdays, home games, and away games. These regression lines are represented in Figure 1.

Finally, to determine the association between social involvement and event-specific drinking, a GEE model was implemented that treated days as nested within individuals. The model was parameterized using the same factors described previously, with the exception that social involvement was modeled instead of average drinks. Results are presented by gender. For women, social involvement did not significantly predict non-game Saturday drinking ($b = 0.17$, $z = 1.86$, $p = .06$). It did, however, predict both home game drinking ($b = 0.20$, $z = 2.03$, $p = .$

04) and away game drinking ($b = 0.37$, $z = 3.47$, $p < 0.001$). These regression lines are represented in Figure 2; of note, the regression equations for non-game Saturdays and home games do not appear to be substantially different, although non-game Saturdays fall on one side of the "critical α" whereas home games fall on the other side; thus, the actual importance of this difference is difficult to gauge. For men, social involvement did not significantly predict increased drinking on non-game Saturdays ($b = -.08$, $z = 0.54$, $p = .59$), home games ($b = .20$, $z = 1.2$ $p = .31$), or away games ($b = -.41$, $z = 1.68$, $p = .09$).

Analysis of Increased Behavioral Risks on Game Days

To determine the moderating effect of game days on the association between consumption and behavioral risks, a GEE model was implemented that treated days as nested within individuals. The model was parameterized to include a day-of-week factor (Sunday – Saturday), a game status factor (home game, away game), gender, and the interactions of gender with game status. The dependent variable in this model was dichotomized to represent whether or not a behavioral risk occurred. Variables also included average drinks (to control for baseline differences in non-specific covariation between heavy drinking and behavioral risks), personcentered daily drinks, and the interaction between daily and average drinks. Interactions between these three variables and game day status also determined whether game day status moderated the influence of consumption levels on behavioral risks. Exploratory analyses indicated no significant interactions of any of the covariates with gender. Presented results include only those marginal effects of relevance (i.e., non-game Saturdays, home games, and away games).

Of note, the two-way interaction between average and daily drinks was significant, $b = -0.015$, $z = 2.50$, $p = 0.01$, implying that the influence of daily drinks is less significant among heavier drinkers than among lighter drinkers. Both the three-way interactions of home game by average drinks by daily drinks ($z = 2.43$, $p = .02$) and away game by average drinks by daily drinks ($z = 2.47$, $p = .01$), however, were significant. Examined individually, the average drinks by daily drinks interaction was not significant for home games ($b = 0.023$, $z = 1.57$, $p = 0.12$) but was for away games ($z = -0.054$, $z = 3.51$, $p < .001$). The marginal regression lines for light drinkers and heavy drinkers are represented in Figure 3. The nature of the three-way interaction indicates that among heavier drinkers, the association between alcohol use and behavioral risks is relatively constant across contexts. Among lighter drinkers, the influence of alcohol use on behavioral risks is negligible for home games, stronger for non-game Saturdays, and highest for away games.

To determine the moderating effect of social involvement on the association between consumption and behavioral risks, a GEE model was implemented that treated days as nested within individuals. The model was parameterized using the same factors described above. Additionally, a main effect of social involvement, social involvement interacted with the day of week indicators, daily drinks, game-day indicators, and daily drinks by game-day indicators were included. None of the variables related to social involvement were significant, all ps > . 10. Thus, social involvement was not related to behavioral risks in any respect across all three contexts of interest.

Discussion

The goals of this study were to examine alcohol consumption and behavioral risks on football game days, as well as test whether average alcohol consumption and social involvement predicted increases in both alcohol consumption and the likelihood of behavioral risks on football game days. Results consistently indicated elevated rates of alcohol consumption for both home and away football games, and average consumption and social involvement served to predict increased consumption. Furthermore, alcohol consumption during game days was differentially associated with behavioral risks depending on whether the game was at home or

away, during the semester or during a semester break, and the individual's gender and level of social involvement.

Rates of Alcohol Consumption on Game Days

Relative to non-game Saturdays, alcohol consumption was greater on both home games and away games. Such a result indicates that increased alcohol consumption is likely to occur regardless of whether students can, or do, attend the game in person. These increased drinking rates were only present, however, when the games were played while students were likely to be on campus (i.e., non-holiday or semester breaks). Drinking levels were quite high for important regular-season games against national and conference rivals, but were quite low for important games against the local Texas rival (played during Thanksgiving break) and both Rose Bowl games (played during the semester break). Thus, the results suggest that the effects of collegiate sporting events are not associated exclusively with the importance of the game (e.g., Neal, et al., 2005) but with the importance of the game as well as the immediate context (i.e., home or away game; in or out of semester session).

Alternative explanations for the lower levels of drinking on these games include the possibility that the 2005 Rose Bowl, which was the day following the heaviest drinking day of the participants' Freshman year (i.e., New Year's Eve), would have had higher levels of consumption had it not followed this well-known drinking day. The lower levels of drinking observed for the 2006 Rose Bowl (wherein UT won the National Championship), however, provide a degree of evidence against this explanation. In particular, it is possible that this game would have resulted in much heavier use of alcohol had it been played after students returned to campus from the winter break. This is of further importance because the vast majority of participants (98.5%) were not of legal drinking age, and thus alcohol was likely more difficult to obtain and consume outside of the campus context.

Increased drinking associated with collegiate football events yielded differential patterns by gender. Overall, men were likely to increase their consumption relative to non-game Saturdays for both home games and away games. The rate of increased drinking, approximately one drink, was consistent across both light and heavy drinkers. Women, on the contrary, were likely to increase their drinking only if they were heavier drinkers and only during away games. For example, women who averaged one drink per day would consume less than one half of an additional drink during away games. Women who averaged four drinks per day, however, would consume approximately two additional drinks during away games. Thus, in general it appears that men increased their drinking consistently for all football games whereas women increased their drinking only for away games and only if they typically drank heavily. These gender differences may be the result of varied approaches to sports-related drinking. Men across all levels of drinking may be more likely to drink while tailgating (for home games) or while at a bar or party (for away games) leading to a uniform increase in alcohol consumption across both settings. Women, however, may be less likely to tailgate; thus, they are likely to increase their drinking only when in an environment which promotes heavy drinking (e.g., a bar or party), and only if they typically drink heavily.

Social involvement also had differential effects on game day alcohol consumption for men and women. For men, social involvement was unrelated to the amount of alcohol consumed in any context. For women, however, social involvement predicted increased consumption for both home games and away games, but was unrelated to non-game Saturday drinking. For women, then, there appears to be a socially-linked component of game-day drinking, particular for away games. This finding is partially consistent with previous research suggesting that social influences play a role in alcohol consumption during sporting events (Rabow & Duncan-Schill, 1995).

Influence of Game Days on Behavioral Risks

Consistent with previous studies of the event-level association between alcohol consumption/ intoxication and alcohol-related consequences and behavioral risks, daily levels of alcohol use were associated with greater likelihood of negative outcomes, and this association was moderated by average consumption (i.e., a tolerance effect; Neal & Carey, in press; Neal & Fromme, 2007). In the current study, however, this apparent tolerance effect was moderated by the presence or absence of a football game. Among heavier drinkers, the degree to which alcohol consumption was associated with an increased likelihood of engaging in behavioral risks was relatively constant across home games, away games, and non-game Saturdays. Regardless of the context, heavier drinkers demonstrated the same likelihood of engaging in behavioral risks as intoxication increased. A more complex pattern emerged for lighter drinkers. During home games, the likelihood of behavioral risks did not vary as a function of alcohol use. Yet for non game Saturdays, the likelihood of behavioral risks increased as alcohol use increased. For away games, the likelihood of behavioral risks increased by a greater amount (relative to non-game Saturdays) as alcohol use increased. Thus for lighter drinkers, it appears that the context of a home football game provided a protective factor against alcohol-related behavioral risks, whereas the context of away games provided increased vulnerability to alcohol-related behavioral risks. Of note, social involvement was completely unrelated to behavioral risks across all three contexts, despite its association with increased game day drinking for women.

Speculation can be undertaken to explain the differences between typical non-game Saturdays, home games, and away games in terms behavioral risks across these contexts. Home games are typically associated with tailgating behavior; however, alcohol sales are banned in the college stadium, which prohibits individuals from consuming alcohol once the game has begun. There may also be a large number of individuals present who could help protect an intoxicated individual against poor decisions or injury, or shield the individual from being detected by campus authorities. Furthermore, the interaction of fans in the stadium may serve as a distraction, while security guards and police officers serve to maintain order. Thus, when attending home football games, individuals may be relatively protected from engaging in other behavioral risks. Away games, however, are likely to be watched on television with groups of friends at a party or bar, where alcohol is freely available and there are few constraints on behavior. Students may also travel to away games, increasing the risk of subsequent drinking and driving. In a small-party setting, students may be also be more likely to experience behavioral risks that are consistent with a party atmosphere, such as sexual assault. Thus, individuals appear to be more likely to engage in other behavioral risks during or immediately following away football games.

Limitations

Several limitations of the current study must be noted. First, it is important to recognize that these data, similar to other event-level studies of sports-related drinking (Neal, et al., 2005) were not collected with the intent of examining drinking on college game days. Thus, several important variables remain unmeasured. The current dataset does not include assessment of whether or where students watched the football games, or what their motivations were for attending each game. Further, it is impossible to know for certain whether students' drinking was specifically linked to the game, or just happened to co-occur on the same day as the game.

Additionally, the data presented herein were collected across two seasons when Texas football was extremely successful. In this respect, these data are similar to Neal, et al., (2005) in that both studies collected data during a National Championship season. Whether drinking rates would remain high during a more normative season remains an empirical question; however,

it is interesting to note that drinking levels during the one loss across the two-year span was not among the top-10 heaviest drinking occasions for that year.

Summary and Clinical Implications

Increased rates of alcohol consumption were observed on football game days. That these increases were observed for both home games and away games, however, indicate that eventspecific interventions (e.g., stadium alcohol bans or random breath alcohol checks) may not be as successful as hoped with regards to reducing sports-related drinking. Clearly, students have the means and the opportunity to consume alcohol regardless of whether the game is held on campus and they chose to attend, or whether the game is away and they watch on television. This is especially true for women, who appear likely to increase their drinking only for away games.

The identification of those students who are likely to increase their drinking during football game days may provide the opportunity for intervention before the sporting event occurs (e.g., earlier in the week, during the off-season). Interventions might be beneficially that are directed toward sports bars, Greek events around football game days, and alcoholic beverage advertisements during the broadcasts of football games. Unfortunately, targeted identification of those who are likely to drink heavily and experience negative outcomes is complex. Men were likely to increase their drinking for all football games, whereas heavy drinking women were likely to increase their drinking only for away games. Likewise, women who had high social involvement with friends were likely to increase their consumption on game days, and these same individuals (particularly lighter drinking women) were most likely to engage in behavioral risks following alcohol consumption. Thus, the highest risk groups may be those women who are highly socially oriented, and lighter drinkers who chose to drink during an away football game when the association between consumption and behavioral risks is the strongest. For women the combination of increases in consumption beyond their average alcohol use, a lack of tolerance to alcohol's effects, and the social context of away games provide a relatively high-risk environment for negative outcomes. Overall these data demonstrate the varied levels of risk for both increased drinking and behavioral risks associated with collegiate football games.

Acknowledgements

References

Bormann CA, Stone MH. The effects of eliminating alcohol in a college stadium: The Folsom Field beer ban. Journal of American College Health 2001;50:81–88. [PubMed: 11590987]

Collins RL, Parks GA, Marlatt GA. Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. Journal of Consulting and Clinical Psychology 1985;53:189–200. [PubMed: 3998247]

Coons CJ, Howard-Hamilton M, Waryold D. College sports and fan aggression: Implications for residence hall discipline. Journal of College Student Development 1995;36:587–593.

Hardin, JW.; Hilbe, JM. Generalized estimating equations. Chapman & Hall/CRC; Boca Raton, FL: 2003.

Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Monitoring the Future national survey results on drug use, 1975-2004. Volume II: College students and adults ages 19-45. National Institute on Drug Abuse; Bethesda, MD: 2005. (NIH Publication No. 05-5728)

Lee CM, Maggs JL, Rankin LA. Spring break trips as a risk factor for heavy alcohol use among first-year college students. Journal of Studies on Alcohol 2006;67:911–916. [PubMed: 17061009]

Miller KA, Jasper CR, Hill DR. Dressing in costume and the use of alcohol, marijuana, and other drugs by college students. Adolescence 1993;28:189–198. [PubMed: 8456608]

Neal DJ, Carey KB. Examining the association between alcohol intoxication and alcohol-related problems: An event-level analysis. Psychology of Addictive Behaviors. In press

Neal DJ, Corbin WR, Fromme K. Measurement of alcohol-related consequences among high school and college students: Application of item-response models to the Rutgers Alcohol Problem Index. Psychological Assessment 2006;18:402–414. [PubMed: 17154761]

Neal DJ, Fromme K. Event-level covariation of alcohol intoxication and behavioral risks during the first year of college. Journal of Consulting and Clinical Psychology 2007;75:294–306. [PubMed: 17469887]

Neal DJ, Fromme K, Del Boca FK, Parks KA, King LP, Pardi AM, Collins RL, Muraven M, Vetter C, Corbin WR. Capturing the moment: Innovative approaches to daily alcohol assessment. Alcoholism: Clinical and Experimental Research 2006;30:282–291.

Neal DJ, Sugarman DE, Hustad JTP, Caska CM, Carey KB. It's all fun and games…Or is it? Collegiate sporting events and celebratory drinking. Journal of Studies on Alcohol 2005;66:291–294. [PubMed: 15957681]

Neighbors C, Oster-Aaland L, Bergstrom RL, Lewis MA. Event- and Context- Specific Normative Misperceptions and High-Risk Drinking: 21st Birthday Celebrations and Football Tailgating. Journal of Studies on Alcohol 2006;67:282–289. [PubMed: 16562411]

Neighbors C, Spieker CJ, Oster-Aaland L, Lewis MA, Bergstrom RL. Celebration intoxication: An evaluation of 21st birthday alcohol consumption. Journal of American College Health 2005;54:76–80. [PubMed: 16255318]

Nelson TF, Wechsler H. Alcohol and college athletes. Medicine and Science in Sports and Exercise 2001;33:43–47. [PubMed: 11194110]

Rabow J, Duncan-Schill M. Drinking among college students. Journal of Alcohol and Drug Education 1995;40:52–64.

Smeaton GL, Josiam BM, Dietrich UC. College students' binge drinking at a beach-front destination during spring break. Journal of American College Health 1998;46:247–254. [PubMed: 9609971]

Wechsler H, Lee JE, Kuo M, Seibring M, Nelson TF, Lee H. Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 Harvard School of Public Health college alcohol study surveys: 1993-2001. Journal of American College Health 2002;50:203–217. [PubMed: 11990979]
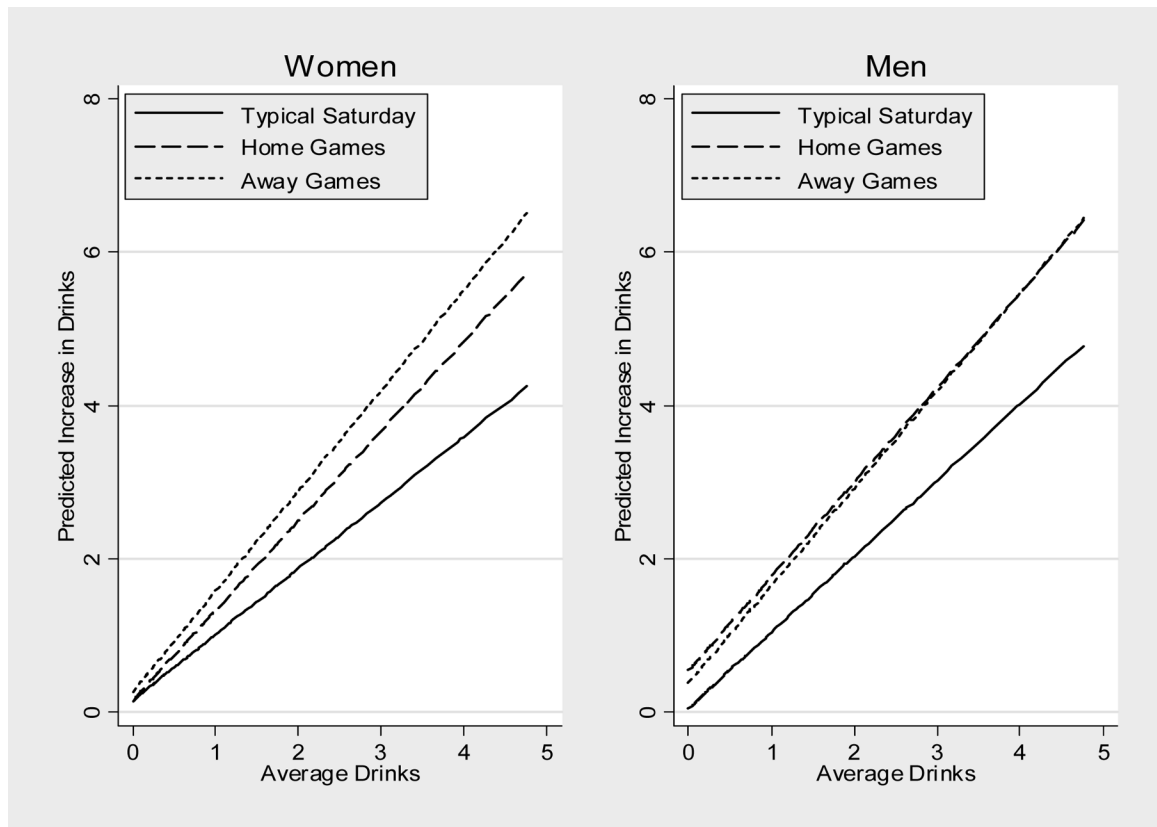
Figure 1.
Predicted increases in consumption as a function of gender and average consumption on typical Saturdays, home games, and away games.
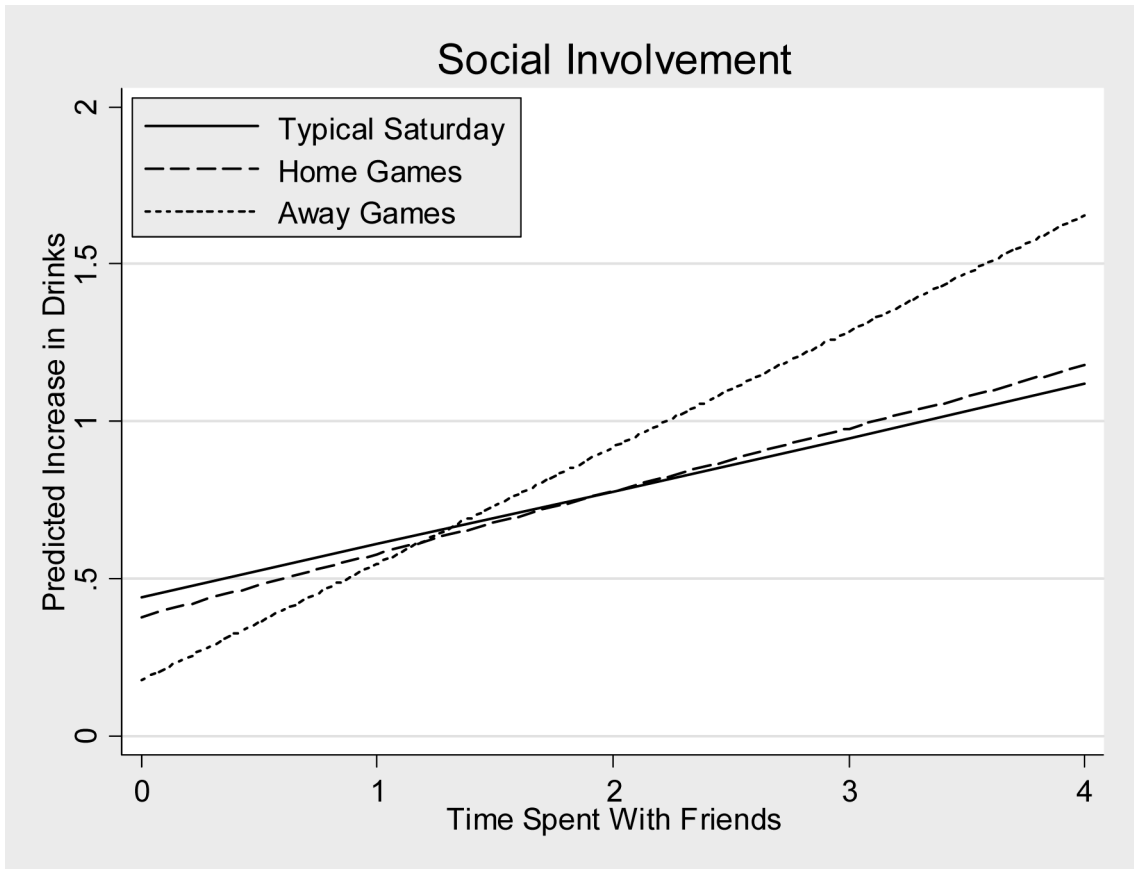
Figure 2.
Predicted increases in women's consumption as a function of social involvement on typical Saturdays, home games, and away games.
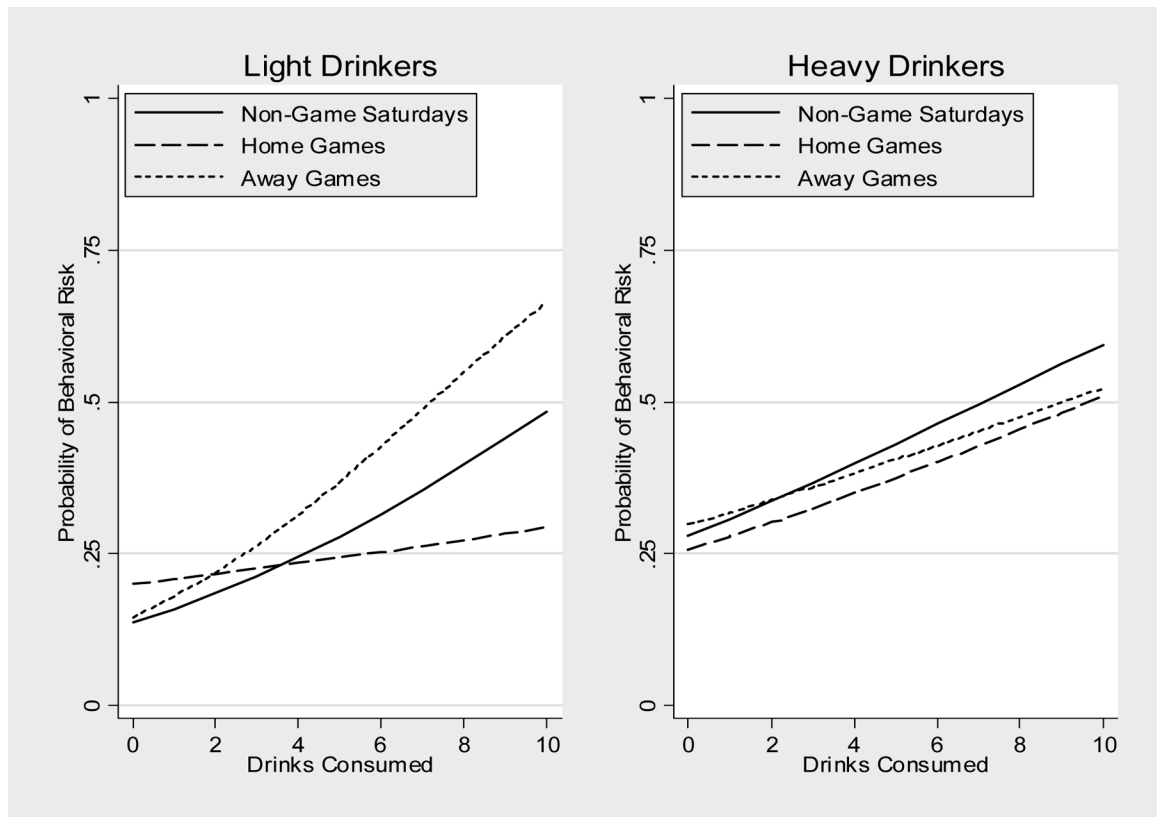
Figure 3.
Probability of engaging in a behavioral risk as a function of average and daily consumption on typical Saturdays, home games, and away games

Table 1

Average alcohol consumption on the 10 heaviest drinking days of each football season.

	Freshman Year				Sophomore Year			
Date	**M**	**SD**	**Note**		**Date**	**M**	**SD**	**Note**
12/31/2004	3.8	4.3	New Years Eve		10/8/2005	3.6	5.3	Away Game,[BC]
10/16/2004	3.0	3.6	Home Game		12/31/2005	3.4	4.2	New Years Eve
11/20/2004	2.5	3.9			9/10/2005	3.3	4.2	Away Game[A]
10/29/2004	2.4	3.5	Halloween Weekend		10/29/2005	3	4.1	Away Game
12/3/2004	2.5	4			9/30/2005	2.9	4.6	
11/19/2004	2.4	3.8			12/9/2005	3.0	4.0	Finals Weekend
11/6/2004	2.0	3.4	Home Game		10/15/2005	2.7	4.4	Home Game
12/11/2004	2.1	3.7	Finals Weekend		10/2805	2.6	4.1	Halloween Weekend
9/11/2004	2.4	3.8	Away Game		10/7/2005	2.8	4.9	
10/23/2004	1.9	3.7	Away Game		10/21/2005	2.6	4.3	

[A]National Rival

[B]Conference Rival

[c]Neutral location