Published in final edited form as:

J Am Coll Health. 2009 ; 57(6): 603–609. doi:10.3200/JACH.57.6.603-610.

Calorie Restriction on Drinking Days: An Examination of Drinking Consequences Among College Students

Steven M. Giles, Ph.D.¹ [Assistant Professor], Heather Champion, Ph.D.² [Senior Research Associate], Erin L. Sutfin, Ph.D.² [Research Assistant Professor], Thomas P. McCoy, M.S.² [Biostatistician III], and Kimberly G. Wagoner, M.P.H.² [Senior Research Associate]

²Department of Public Health Sciences, Wake Forest University School of Medicine

Abstract

Objective—This study examined the association between restricting calories on intended drinking days and drunkenness frequency and alcohol-related consequences.

Participants—Participants included a random sample of 4,271 undergraduate college students from 10 universities.

Methods—Students completed a web-based survey regarding their high-risk drinking behaviors and calorie restriction on intended drinking days.

Results—Thirty-nine percent of past 30-day drinkers reported restricting calories on days they planned to drink alcohol, of which 67% restricted because of weight concerns. Restricting calories on drinking days was associated with greater odds of getting drunk in a typical week. Women who restricted were more likely to report memory loss, being injured, being taken advantage of sexually and having unprotected sex while drinking. Men were more likely to get into a physical fight.

Conclusions—These results highlight the importance of considering weight control behaviors in the examination of high-risk college drinking.

A notable body of literature has linked disordered eating, or extreme weight control or weight-related behaviors, to other problem behaviors, such as alcohol abuse,^{1, 2} cigarette use,³ and the use of other substances such as Ecstasy, marijuana, inhalants, and nonmedical psychotherapeutics.^{4, 5} Vomiting and laxative use, for instance, have been associated with suicide ideation, suicide attempts, and unsafe sexual activity.⁵ Individuals engaging in weight control behaviors are not only more likely to engage in other health-compromising behaviors, but may also experience greater consequences of substance use.⁵ For instance, dieting and purging food among female college students has been associated with greater negative consequences from alcohol use.^{6, 7}

Much of the research examining disordered eating and alcohol consumption among college students has focused on those who have been clinically diagnosed. However, studying the relationship between disordered eating and alcohol consumption among college students who have not been diagnosed with an eating disorder is particularly important, especially since dieting and weight concerns have been shown to predate and predict the diagnosis of an eating disorder.^{8, 9}

¹Please address all correspondence to: Steven M. Giles, 319 Carswell Hall, Department of Communication, Wake Forest University, Winston-Salem, NC 27109.

On college campuses, disordered eating may be particularly problematic. The National Eating Disorders Association recently reported that 20% of college students believed they have had an eating disorder at some point in their lives, though only 25% of these same students indicated receiving any treatment.¹⁰ Engagement in problematic weight-control behaviors can have a damaging effect on mental and long-term health.¹¹

Females are more likely than males to be dissatisfied with their bodies and to desire a thinner shape.^{12–14} However, body dissatisfaction and eating problems among males is not trivial.^{15, 16} Indeed, recent studies have found that 30% of adolescent boys reported either binge eating or using unhealthy weight control behaviors,¹⁷ while up to 40% of male undergraduates reported dieting.¹⁸

Because the college experience is defined by high rates of dangerous drinking, studying the relationship between high-risk alcohol use and weight control behaviors is important. Four out of five college students drink, and half of them engage in heavy episodic drinking, defined as five or more drinks in a row in the past two weeks for males and four or more for females.^{19–22} In addition, the annual consequences associated with alcohol use are alarming. Among students aged 18–24, there are 1,700 alcohol-related deaths, 599,000 injuries, 696,000 physical assaults, 97,000 sexual assaults, and 2.8 million intoxicated student drivers.²³ Given that drinking alcohol involves consuming empty calories, one might assume that individuals with weight concerns would either avoid drinking or compensate by paying particular attention to their diet, especially on days they plan to drink. It is this latter proposition that forms the basis of this study.

Specifically, this study aims to 1) identify the prevalence of and reasons for restricting calories on drinking days, 2) determine whether restricting calories on drinking days is associated with the frequency of getting drunk, and 3) ascertain whether individuals who restrict calories on drinking days experience greater consequences from alcohol use.

METHODS

In fall 2006 a random sample of undergraduate college students attending ten universities (8 public and 2 private) in North Carolina were invited to complete a web-based survey as part of a randomized group trial of an intervention to prevent high-risk drinking behaviors and their consequences on college campuses and surrounding communities. Students from each campus were randomly selected from undergraduate enrollment lists to participate in the survey.

A total of 4,271 students completed the survey with data for all of the items assessed in this paper available from 4,100 students. Only students who reported drinking alcohol in the past 30 days were included in this study ($N=2,873$; 70% of entire sample). The sample was 58% female, 82% non-Hispanic White, 6% African-American, 4% Hispanic, 5% Asian/Pacific-Islander, and 4% Other. Approximately 22% of the sample were freshmen; 25% were sophomores; 25% were juniors, and 24% were seniors. The average age of the students was 20.6 years ($SD = 2.68$). See Table 1 for descriptive results of sample demographics, lifestyle factors, college-level factors, and health risk behaviors.

Procedures

Email invitations were sent to the random sample of participants at each school and provided a link to a secured web site where the survey could be completed. The email notification protocol for the web-based survey, including multiple, frequent reminders, was based on the Dillman approach.²⁴ All students who completed the survey were sent emails awarding them \$10.00 in PayPal dollars with instructions on how to deposit them into their

checking or savings account. The campuses varied substantially in the degree and time that students responded to the email invitations to participate, with some schools exceeding the target sample in 48 hours and others schools requiring the full fielding period (approximately 4 weeks) and four reminder emails without reaching the target sample size for each class year. The response rate across the 10 schools was 21%. This response rate is consistent with response rates found in other web-based surveys of college students.²⁵ The protocol was approved by the our Institutional Review Board, as well as several participating schools that required additional IRB review and approval at their home institutions.

The web-based College Drinking Survey (CDS) was adapted from items previously used in the Harvard College Alcohol Survey,²⁶ the Core Institute Drug and Alcohol Survey,²⁷ the Youth Survey used in the National Evaluation of the Enforcing Underage Drinking Laws Program,^{28, 29} and the CDC's Youth Risk Behavior Survey.³⁰ The survey consisted of 318 items with multiple skip patterns based on the absence of reported behaviors, and took approximately 25 minutes to complete, depending on the skip patterns of each student. The survey focused on alcohol use and measured demographic variables, alcohol consumption behaviors, perceptions about other students' drinking, and consequences experienced from their own drinking, as well as consequences from other students' drinking.

The following demographics were considered in the analyses: student age (continuous; range=17–30), race (categorical with four indicator variables: reference category=non-Hispanic White), Greek status (two indicator variables for Greek member or pledge: referent=neither), athlete status (two indicator variables for varsity or intramural athlete: referent group=neither), residence location (indicator variable for off-campus: referent=on campus). School was considered as a random effect in the statistical analyses (see Statistical Analysis below).

One item was used to determine whether participants restricted calories on the days they planned to drink alcohol. Participants were asked to report how often they restricted food, fat, or calories on days they planned to drink alcohol. Response options ranged from 1 (never) to 5 (very often). For those indicating they restricted calories on alcohol use days (seldom, sometimes, often, or very often), a follow up question asked whether they did so to reduce the number of calories or to get drunk faster. Response options included 1=no, 2=sometimes, 3=yes. Reasons for restricting were not mutually exclusive. Respondents were also given the option to specify "other" reasons for restricting calories on drinking days.

Three items were considered in measuring alcohol use: past 30-day alcohol use; typical days drunk in a week and "typical quantity." We considered only those who had drank in the past 30 days when examining the association of getting drunk in a typical week (1+ days=1, 0 days=0) and past 30 day alcohol-related consequences with restricting calories on days planning to drink. For the modeling of alcohol-related consequences, typical number of drinks was considered as a continuous covariate (range=1–15).

Six items were used to measure alcohol-related consequences, based on Anderson and colleagues:⁶ (1) did something I later regretted, (2) memory loss, (3) was hurt or injured, (4) got into a physical fight, (5) was taken advantage of sexually and (6) had unprotected sex. Students were asked to report the prevalence of each of these consequences for the 30 days prior to the survey.

Statistical Analysis

The goals of the statistical analysis were to: (1) explore the characteristics of students who restricted calories on days they plan to drink and their reasons why; (2) examine if

restricting food, fat or calories on drinking days is associated with getting drunk in a typical week and (3) examine if restricting calories is associated with alcohol-related consequences after adjusting reported weekly drunkenness or if the effect of restricting depends interaction with student's drinking behaviors.

For (1), distributions for student characteristics by restricting status were examined using contingency tables and descriptive statistics such as mean and standard deviation. Restricting calories on days planning on drinking was used as a dichotomous indicator variable in the analyses (1=yes, 0=no). We modeled weekly drunkenness from students who reported getting drunk in a typical week,³¹ using an indicator variable in analyses (1=gets drunk at least once, 0=does not get drunk). School was considered a random effect in all analyses in order to take into account the intra-school correlation induced by the school. Here, students were considered nested within the schools in the modeling. Clustered logistic regression was used to model restricting calories on days planning to drink (clustered by school) and its association with student characteristics for (1).

Clustered logistic regression was again used to model the probability of student drunkenness in a typical week as the outcome for (2). Adjusted odds ratios (AOR) and their 95% CI's were estimated in the logistic models. Finally, clustered logistic regression was again used in the modeling of the six alcohol-related consequences for (3), stratified by gender. All statistical analyses were performed using Stata version 10 (StataCorp, College Station, TX). A two-sided p-value<0.05 was considered to be statistically significant.

RESULTS

Out of all 4,271 students, 67% reported drinking in the past 30 days. Of these drinkers, 1,106 (39%) reported restricting food, fat or calories on days the student was planning to drink alcohol (Table 1). Twenty-nine percent of males reported restricting compared to 45% of females ($p<0.001$). Students who restrict on drinking days were slightly but significantly younger ($p<0.001$), with at least 40% of freshmen and sophomores reporting restricting compared to 36% of juniors and 37% of seniors. There were also significant differences in the racial composition of students who restrict ($p<0.01$). African-American students reported restricting the least (lowest at 23%). Half of Greek pledges reported restricting on drinking days while 46% of Greek members reported restricting ($p<0.001$).

Of the past 30-day drinkers who reported restricting on days they plan to drink alcohol, 47% of females and 32% of males reported the reason they restricted was weight concerns. Only 5% of female drinkers reported the reason was to get drunk faster in contrast to 11% of males. Twenty-seven percent of females reported both weight concerns and getting drunk were reasons compared to 17% of males citing both. Sixteen percent of females and 30% of males said they restricted on drinking days but gave no reason. One percent of females and 4% of males cited other reasons for restricting. The most common "other" reason for restricting calories on drinking days was to *avoid* getting sick ($n=26$, 43%), followed by weight concerns ($n=10$, 17%; "staying fit," "because I'll be drinking calories," "to avoid gaining weight, not lose.") Additionally, respondents indicated a concern for being full and not having room in their stomach for alcohol ($n=8$, 13%), saving food money to buy alcohol ($n=8$, 13%), not having time to eat ($n=5$, 8%), and other reasons ($n=3$, 5%; health reasons, not hungry, to have sex).

Restricting food, fat or calories on drinking days was significantly associated with increased likelihood of reporting getting drunk in a typical week for both males and females (Table 2; $p<0.001$). For males, the odds of getting drunk were 99% higher for restricting students compared to those who did not restrict (AOR=1.99; 95% CI=[1.48, 2.68]). For females, the

odds of getting drunk were 137% higher for those that restrict compared to those who did not restrict (AOR=2.37; 95% CI=[1.92, 2.92]).

The association of restricting and alcohol-related consequences was much more pronounced for females than males. After adjusting for demographics and typical quantity of alcohol consumed, the only consequence where there was a significant association with restricting on drinking days for males was “got into a physical fight” (AOR=1.82; 95% CI=[1.14, 2.90]). Thus, males that restrict on drinking days had 82% higher odds of reporting getting into a physical fight than males that did not restrict, adjusting for their demographics and typical quantity of drinking. Conversely, getting into a physical fight was the only consequence not associated with restricting on drinking days for females ($p=0.21$). Restricting on drinking days for females was significantly associated with increased likelihood of reporting memory loss, being hurt or injured, being taken advantage of sexually and having unprotected sex ($p<0.01$) (after adjusting for demographics and typical quantity of alcohol consumed). The effect of restricting on drinking days for “did something I later regretted” depended on the female student’s reported typical number of drinks (Figure 1; interaction $p<0.05$). Here, restricting appeared to have increased risk for those females reporting fewer typical drinks, with the effect lessening as the number of drinks increased.

COMMENT

A substantial percentage of past 30-day drinkers in our sample reported restricting calories on days they planned to drink because of concerns about calorie consumption. Although this discrete behavior does not indicate an eating disorder, per se, it does demonstrate that appearance concerns affect the eating behavior of men and women in ways that put them at risk for alcohol-related consequences. The fact that men restrict calories because of weight concerns is not trivial; these men are more likely to get drunk and get into physical fights. Future research should further explicate the reasons why men restrict calories, as well as determine how men who restrict calories might differ in other ways from men who do not restrict (e.g., personality variables, body esteem). Indeed, although most research on eating disorders has focused primarily on women, some researchers have advocated for increased attention to males with eating pathology.^{15, 16}

Restricting calories on drinking days was particularly problematic for women. Women who restricted calories on drinking days were more likely than non-restrictors to report memory loss, being hurt or injured, being taken advantage of sexually and having unprotected sex as a consequence of their alcohol consumption, even after controlling for typical quantity of alcohol consumed. Interestingly, restricting women who drank fewer drinks were more likely to report doing something they later regretted compared to women who consumed more drinks. This is consistent with Dunn, Larimer, and Neighbors who found that college students who met the criteria for bulimia nervosa experienced greater consequences from alcohol use, despite not drinking more than non-eating disordered individuals.³² They argue that individuals who engage in disordered eating may restrict their use of substances because of concerns about caloric intake, fear of losing control, or the belief that use will lead to purging. They may also engage in substance use in order to fit in with their peers. Our findings support these conclusions and suggest that those who restrict calories on drinking days and drink less may be more prone to disinhibition. Future research should consider the potential contribution of peer influence on alcohol consumption and calorie restriction.^{13, 33}

Additionally, if these same individuals are inclined to engage in extreme weight control behaviors on a normal basis (e.g., purging of food) then the effect of alcohol consumption may be more pronounced, albeit with fewer drinks, than for individuals who do not normally enact weight control behaviors. Interestingly, 43% of individuals who reported “other”

reasons for restricting calories on drinking days indicated they did so to *avoid* getting sick from alcohol. In the current study we did not categorize individuals based on the presence or absence of eating pathology, nor did we attempt to obtain an eating disorder diagnosis. Participants also did not report Body Mass Index (BMI). Therefore, we cannot say that individuals with eating disorders are more likely to experience alcohol-related consequences compared to non-clinical or community samples. We also cannot determine the extent to which current weight, as measured by the BMI, might relate to both calorie restriction and alcohol consequences. The relationships among body dissatisfaction, BMI, peer influence, calorie restriction on drinking days, and alcohol-related consequences warrants further research. It is also important to examine these relationships among both non-clinical and clinical samples of college students.

The results of this study should be interpreted with the following caveats in mind. First, although we obtained a random sample from among 10 colleges/universities, our sample was not particularly diverse in regards to race; non-Hispanic whites comprised 82.9% of the total sample. There is recent evidence that disordered eating is prevalent among Hispanic and American Indian youth.¹⁷ Therefore, it may be problematic to generalize these findings beyond traditional college campuses, or those that consist of a high concentration of Caucasian students.

Second, as with all survey research, the data reported here are self-report and subject to bias. Students were asked to recall information about restricting calories and drinking behavior that can be over- or underestimated. Additionally, it is impossible with these correlational data to infer a causal relationship between restricting calories on drinking days and alcohol-related consequences, including getting drunk. That is, we do not know whether students got drunk or experienced alcohol-related consequences on the particular days in which they restricted calories, we can only say that those who reported restricting in the past 30 days were significantly more likely to experience these consequences.

Third, there are inherent limitations of web-based surveys. Some universities are more technologically advanced and create a more private and conducive atmosphere for completing surveys of a sensitive nature. As a consequence, response rates vary by institution, depending on whether students have ready access to the web and whether they can complete surveys with personal computers. However, online surveys still provide great advantages over standard paper-and-pencil measures, including more favorable psychometric qualities (34), greater completeness of data (35), and enhanced comfort among participants to disclose sensitive information(36).

The results of this study may provide important insights for college health educators who work to reduce underage and dangerous drinking. Many efforts to prevent alcohol abuse on college campuses involve educational or awareness programs, cognitive-behavioral interventions, motivational enhancement techniques, norms clarification, social marketing campaigns, and universal or environmental approaches, such as limiting alcohol availability and increasing criminal measures.^{37, 38} In devising messages within each of these approaches, college health educators should consider that for many college students consuming alcohol conflicts with their desire to maintain or obtain a particular body physique. When this happens, they may resort to unhealthy weight control behaviors, such as restricting calories on days they plan to drink, in order to compensate. This, in turn, may produce greater likelihood of drunkenness and consequences. Approaches to preventing alcohol that also aim to promote healthy eating or reduce drive for thinness may be more effective. Educating students about the dangers of consuming alcohol on an empty stomach may also be useful.

Acknowledgments

This publication was supported by the National Institute of Alcohol Abuse and Alcoholism (NIAAA) Grant #R01 AA14007 and by funds from the Division of Mental Health, Developmental Disabilities and Substance Abuse Service of the North Carolina Department of Health and Human Services, the U.S. Office of Juvenile Justice and Delinquency Prevention through the Enforcing Underage Drinking Laws program, and Wake Forest University Interim Funding. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Alcohol Abuse and Alcoholism or the National Institutes of Health.

References

1. Dansky BS, Brewerton TD, Kilpatrick DG. Comorbidity of bulimia nervosa and alcohol use disorders: Results from the National Women's Study. *Int J Eat Disord*. 2000; 27:180–190. [PubMed: 10657891]
2. O'Brien KM, Vincent NK. Psychiatric comorbidity in anorexia and bulimia nervosa: Nature, prevalence, and causal relationships. *Clin Psychol Rev*. 2003; 23:57–74. [PubMed: 12559994]
3. Crisp A, Sedgwick P, Halek C, Joughin N, Humphrey H. Why may teenage girls persist in smoking? *J Adolesc*. 1999; 22:657–672. [PubMed: 10527537]
4. Cance J, Ashley O, Penne M. Unhealthy weight control behaviors and MDMA (Ecstasy) use among adolescent females. *J Adolesc Health*. 2005; 37:409. [PubMed: 16227128]
5. Neumark-Sztainer D, Story M, Dixon LB, Murray D. Adolescents engaging in unhealthy weight control behaviors: Are they at risk for other health-compromising behaviors? *Am J Public Health*. 1998; 88:952–955. [PubMed: 9618628]
6. Anderson DA, Martens MP, Cimini MD. Do female college students who purge report greater alcohol use and negative alcohol-related consequences? *Int J Eat Disord*. 2005; 37:65–68. [PubMed: 15690469]
7. Krahn DD, Kurth CL, Gomberg E, Drewnowski A. Pathological dieting and alcohol use in college women--a continuum of behaviors. *Eat Behav*. 2005; 6(1):43–52. [PubMed: 15567110]
8. Leon GR, Fulkerson JA, Perry CL, Keel PK, Klump KL. Three to four year prospective evaluation of personality and behavioral risk factors for later disordered eating in adolescent girls and boys. *J Youth Adolesc*. 1999; 28:181–196.
9. Levine, MP.; Smolak, L. *The Prevention of Eating Problems and Eating Disorders: Theory, Research, and Practice*. Mahwah, NJ: LEA; 2006.
10. [Accessed January 18, 2008] NEDA announces results of eating disorders poll on college campuses across the nation. Available at http://www.nationaleatingdisorders.org/p.asp?WebPage_ID=664
11. Neumark-Sztainer D, Hannan PJ. Weight-related behaviors among adolescent girls and boys: Results from a national survey. *Arch Pediatr Adolesc Med*. 2000; 154:569–577. [PubMed: 10850503]
12. Barker ET, Galambos NL. Body dissatisfaction of adolescent girls and boys: Risk and resource factors. *J Early Adolesc*. 2003; 23(2):141–165.
13. Paxton SJ, Schutz HK, Wertheim EH, Muir SL. Friendship clique and peer influences on body image concerns, dietary restraint, extreme weight-loss behaviors, and binge eating in adolescent girls. *J Abnorm Psychol*. 1999; 108:255–266. [PubMed: 10369035]
14. Rosenblum GD, Lewis M. The relations among body image, physical attractiveness, and body mass in adolescence. *Child Dev*. 1999; 70:50–64. [PubMed: 10191514]
15. Corson, PW.; Andersen, AE. Body image issues among boys and men. In: Cash, TF.; Pruzinsky, T., editors. *Body Image: A Handbook of Theory, Research, and Clinical Practice*. New York: Guilford Press; 2002. p. 192-199.
16. Pope, HG., Jr; Phillips, KA.; Olivardia, R. *The Adonis complex: The secret crisis of male body obsession*. New York: Free Press; 2000.
17. Croll J, Neumark-Sztainer D, Story M, Ireland M. Prevalence and risk and protective factors related to disordered eating behaviors among adolescents: relationship to gender and ethnicity. *J Adolesc Health*. 2002; 31:166–175. [PubMed: 12127387]

18. Grogan, S. *Body Image: Understanding Body Dissatisfaction in Men, Women, and Children*. New York: Routledge; 1999.
19. Wechsler H, Dowdall GW, Maenner G, Gledhill-Hoyt J, Lee H. Changes in binge drinking and related problems among American college students between 1993 and 1997: Results of the Harvard School of Public Health College Alcohol Study. *J Am Coll Health*. 1998; 47:57–68. [PubMed: 9782661]
20. Wechsler H, Kuo M. College students define binge drinking and estimate its prevalence: Results of a national survey. *J Am Coll Health*. 2000; 49:57–64. [PubMed: 11016129]
21. 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 surveys: 1993–2001. *J Am Coll Health*. 2002; 50:203–217. [PubMed: 11990979]
22. O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *J Stud Alcohol*. 2002; (Supplement):23–39.
23. Hingson R, Heeren T, Winter W, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: Changes from 1998 to 2001. *Ann Rev Public Health*. 2005; 26:259–79. [PubMed: 15760289]
24. Dillman DA. Mail and internet surveys: The tailored design method. New York supplement. 2000:575. Second series(8750-264x).
25. Kaplowitz MD, Hadlock TD, Levine R. A comparison of web and mail survey response rates. *Public Opin Q*. 2004; 68(1):94–101.
26. Wechsler H, Davenport A, Dowdall G, Moeykens B, Castillo S. Health and behavioral consequences of binge drinking in college. A national survey of students at 140 campuses. *JAMA*. 1994; 272:1672–1677. [PubMed: 7966895]
27. Presley CA, Meilman PW, Lyster R. Development of the Core Alcohol and Drug Survey: Initial findings and future directions. *J Am Coll Health*. 1994; 42:248–255. [PubMed: 8046164]
28. Preisser JS, Young ML, Zaccaro DJ, Wolfson M. An integrated population-averaged approach to the design, analysis and sample size determination of cluster-unit trials. *Stat Med*. 2003; 22:1235–1254. [PubMed: 12687653]
29. Wolfson, M.; Altman, D.; DuRant, RH., et al. Winston-Salem: Wake Forest University School of Medicine. 2004. National evaluation of the Enforcing Underage Drinking Laws Program: Year 4 report.
30. Kolbe L. An epidemiological surveillance system to monitor the prevalence of youth behaviors that most affect health. *Health Educ*. 1990; 21:44–48.
31. O'Brien MC, McCoy TP, Champion H, et al. Single question about drunkenness to detect college students at risk for injury. *Acad Emerg Med*. 2006; 13:629–636. [PubMed: 16614453]
32. Dunn EC, Larimer ME, Neighbors C. Alcohol and drug-related negative consequences in college students with bulimia nervosa and binge eating disorder. *Int J Eat Disord*. 2002; 32:171–178. [PubMed: 12210659]
33. Paxton, SJ. Peer relations, body image, and disordered eating in adolescent girls: Implications for prevention. In: Piran, N.; Levine, MP.; Steiner-Adair, C., editors. *Preventing eating disorders: A handbook of interventions and specific challenges*. New York: Brunner/Mazel; 2000. p. 134-147.
34. Ployhart RE, Weekley JA, Holtz BC, Kemp C. Web-based and paper-and-pencil testing of applicants in a proctored setting: Are personality, biodata, and situational judgment tests comparable? *Personnel Psychology*. 2003; 56:733–752.
35. Kongsved SM, Basnov M, Holm-Christensen K, Hjollund NH. Response Rate and Completeness of Questionnaires: A Randomized Study of Internet Versus Paper-and-Pencil Versions. *Journal of Medical Internet Research*. 2007; 9(3) Published online 2007 September 30. 10.2196/jmir.9.3.e25
36. Davis RN. Web-based administration of a personality questionnaire: comparison with traditional methods. *Behavior Research Methods, Instruments, & Computers*. 1999; 31(4):572–577.
37. Larimer M, Currence J. Identification, prevention and treatment: A review of individual-focused strategies to reduce problematic alcohol consumption by college students. *J Stud Alcohol*. 2002; (Supplement 14):148–163.
38. NIAAA. *A Call to Action: Changing the Culture of Drinking at US Colleges*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 2002. NIH Pub. No. 02-5010

Figure 1.

Association of restricting food, fat or calories on days planning to drink alcohol and “did something I later regretted” (1+ times in past 30 days) for past 30 day female drinkers (N=1,673)

Table 1

Characteristics of past 30 day drinkers by reporting restricting food, fat or calories on days planning to drink alcohol (N=2,873)

Characteristic	Overall N = 2,873 (% overall)	Non-restricting students N=1,767 (61.5%) N (row %) or mean $\pm$ sd	Restricting students N=1,106 (38.5%) N (row %) or mean $\pm$ sd
Gender ***			
Male	1,179 (41)	840 (71)	339 (29)
Female	1,673 (58)	913 (55)	760 (45)
No response	21 (<1)	14 (67)	7 (33)
Academic classification			
Freshman	622 (22)	372 (60)	250 (40)
Sophomore	721 (25)	421 (58)	300 (42)
Junior	710 (25)	451 (64)	259 (36)
Senior	679 (24)	426 (63)	253 (37)
Other	112 (4)	75 (67)	37 (33)
No response	29 (1)	22 (76)	7 (24)
Age ***	20.6 $\pm$ 2.68	20.8 $\pm$ 2.83	20.3 $\pm$ 2.41
Race **			
Caucasian	2,343 (82)	1,416 (60)	927 (40)
African-American	168 (6)	129 (77)	39 (23)
Hispanic	103 (4)	60 (58)	43 (42)
Asian/Pacific-Islander	132 (5)	87 (66)	45 (34)
Other	118 (4)	69 (58)	49 (42)
No response	9 (<1)	6 (67)	3 (33)
Greek status ***			
Pledge	127 (4)	64 (50)	63 (50)
Member	317 (11)	170 (54)	147 (46)
Non-Greek	2,429 (85)	1,533 (63)	896 (37)
Athletic status			
Intramural	692 (24)	424 (61)	268 (39)
Varsity	139 (5)	89 (64)	50 (36)
Non-athlete	2,042 (71)	1,254 (61)	788 (39)
Campus Residence			
On-campus	1,487 (52)	917 (62)	570 (38)
Off-campus	1,380 (48)	846 (61)	534 (39)
No response	6 (<1)	4 (67)	2 (33)

* p<0.05;

** p<0.01;

p<0.001 from clustered logistic regression comparing students who restrict to non-restricting students (clustered by school).

Association of restricting food, fat or calories on days planning to drink alcohol and getting drunk in a typical week for past 30 day male and female student drinkers (N=2,873)

Table 2

Model for Sex	Non-restricting Predicted % (95% CI)	Restricting students Predicted % (95% CI)	AOR (95% CI)	z statistic	p-value*
Males	57.2% (52.1, 62.3)	72.8% (66.5, 78.2)	1.99 (1.48, 2.68)	4.56	<0.001
Females	35.7% (31.6, 39.9)	56.8% (52.1, 61.3)	2.37 (1.92, 2.92)	8.08	<0.001

* p-value is from comparing restricting students to non-restrictors in a multivariable clustered logistic regression model adjusting for student age, race, greek status, athlete status, residence location and within-school clustering.