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College Student Alcohol Consumption, Day of the Week, and Class Schedule

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Abstract

Background—For many college students, Friday class schedules may contribute to weekend-like drinking behaviors beginning on Thursday. This study characterizes college students' daily alcohol consumption patterns and the relation between Thursday drinking and Friday classes overall and for specific vulnerable groups.

Methods—A sample of 3,341 volunteer participants was drawn from 3,713 eligible first-time undergraduates (56% female, 90% non-Hispanic white). Eligible participation rates ranged from 66.5 to 74.0% across follow-ups; 90% contributed data at for least one follow-up. Precollege survey and web-based surveys administered in the fall and spring semesters across 4 years of college were merged with student academic transcripts and university academic schedules at a large Midwestern public university. The main outcome measures included past 7-day self-reports of drinking behavior for each of 8 semesters.

Results—Excessive drinking on Thursday, relative to other weekdays, was found and was moderated by Friday class schedule: hierarchical linear models indicated that students with no Friday classes drank approximately twice as much on Thursdays as students with early Friday classes (i.e., mean drinks = 1.24 for students with early Friday class vs 2.41 for students with no Friday class). Students who had classes beginning at 12 PM. or later consumed similar amounts as those with no Friday classes (M = 2.52). The magnitude of the Friday class effect was comparatively larger among males and among those who were members of the Greek system or participated in Greek activities. Ancillary analyses based on the subset of students who showed within-subject variability in Friday classes across semesters (i.e., had both early and late or no Friday classes) produced findings similar to those based on the entire sample. Little evidence was found for compensatory drinking on Friday and Saturday among those with early Friday classes.

Conclusions—Rates and amounts of alcohol consumption on Thursday are high, although they appear to be influenced by the presence and timing of Friday classes. Friday classes, especially those before 10 AM, may reduce excessive drinking. Controlled institutional interventions are suggested to provide definitive research on the causal status of these ostensibly strong effects. This research provides a strong rationale for conducting such research.

Keywords

Alcohol Drinking; Students; Universities; Alcoholic Beverages; Alcohol Deterrents

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The High Prevalence of problematic alcohol use on college campuses is well documented (Johnston et al., 2004; Presley and Cashin, 1996; Wechsler et al., 2000), as are the associated health-related negative consequences experienced by college students, which include death (Hingson et al., 2002), hangover and blackouts (Perkins, 2002), driving under the influence (Presley and Cashin, 1996), high-risk sexual behavior (Desiderato and Crawford, 1995), assault (Hingson et al., 2005; Presley and Cashin, 1996), and the development of alcohol-use disorders (Knight et al., 2002). Because of the pervasive and pernicious nature of problematic college alcohol use, understanding the etiology of and developing solutions for problem drinking on college campuses is of importance to college administrators, health professionals, and alcohol researchers.

Research on problematic drinking during college has identified several individual-level, as well as environmental-level factors that place students at risk. Individual-level risk factors include being male (O'Malley and Johnston, 2002), drinking heavily before college (Wechsler et al., 1995), being involved in the fraternity or sorority (Greek) system (Engs et al., 1996), having lower levels of academic preparation, and poor performance on precollege assessments of cognitive ability and academic aptitude (Wood et al., 2002). Environmental-level risk factors for problematic drinking in college students include the social, or partying, environment at the college (Maggs, 1997), the degree to which alcohol is readily available and affordable (Chaloupka and Wechsler, 1996; Wechsler et al., 2000), and factors such as geographic region (Wechsler et al., 1994) and type of academic institution (Presley et al., 2002).

Interventions aimed at reducing the college alcohol problem often reflect an awareness of the multiple risk factors involved. Recently, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) evaluated college-drinking interventions and subsequently proposed a list of recommended strategies (NIH Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism, 2002a, 2002b). This list includes interventions shown to be effective with college students (e.g., motivational enhancement interventions) and interventions shown to be effective with the general population but that could be applied to the college setting (e.g., increased enforcement of minimum drinking age laws). In addition, the task force recommended several promising strategies for use with college students (e.g., increasing enforcement at campus-based events that promote excessive drinking; consistently enforcing campus disciplinary actions associated with policy violations). One such strategy cited by the task force is to reduce "Thursday night partying" on college campuses by "reinstating Friday classes and exams" (p. 21). This strategy of curtailing weekend-like drinking on Thursdays by re-including Friday as an integral part of the academic week also has caught the attention of college administrators who have been considering the value of "reclaiming Friday" (Young, 2003).

Although the existence of weekend-like drinking on Thursdays (often called "thirsty Thursday") on college campuses, as well as the hypothesized role of Friday class schedule in the phenomenon have been widely discussed, these issues have received little attention in the research literature. We are aware of only 2 studies that touched on the issue of Thursday drinking, both of which examined data gathered predominantly from college freshmen (Del Boca et al., 2004; Paschall et al., 2006). Del Boca and colleagues provided evidence for a "thirsty-Thursday" phenomenon among college freshmen and found weekend-like drinking on Thursdays to be stable across the freshman year. Because Del Boca and colleagues focused primarily on weekly alcohol consumption across the freshman academic year, they dealt only briefly with day-of-the-week drinking and not at all with the role of Friday class schedule. These day-of-the-week findings are also limited by characteristics of the sample, most notably the oversampling of at-risk individuals with a positive family history of alcoholism. Paschall et al. (2006), by contrast, examined patterns of typical daily consumption of alcohol in a predominantly freshman sample of New Zealand college students with the goals of examining

whether heavy-drinking students were more or less likely to subsequently enroll in Friday classes and whether scheduling at least one Friday class reduced the likelihood of heavy drinking on Thursday. They found evidence that heavy-drinking students were less likely to subsequently enroll in classes that convene on Friday. When examining the effects of scheduled Friday classes, they found a bivariate association between having no Friday class and past-month alcohol consumption or heavy-drinking episodes in the past month, but found no relation when logistic and multiple regressions of second semester consumption were calculated, which included first-semester drinking behavior. They did, however, find evidence that having no Friday classes increased the probability of Thursday being the heaviest drinking day of the week. As Paschall and colleagues note, these data examined only the presence/absence of Friday classes and not the timing of Friday classes.

Thus, although some documentation of the thirsty-Thursday phenomenon exists, systematic, prospective research is needed to document the degree of the phenomenon across the undergraduate years and to ascertain whether the effect is more pronounced for known at-risk subpopulations. In addition, because only one prior published study has directly addressed how students' class schedule on Friday relates to Thursday drinking behavior, more research is needed to assess directly the magnitude of this effect and to evaluate whether this effect varies as a function of other known risk factors for collegiate alcohol consumption. The present paper, therefore, has 3 primary goals. The first is to provide direct information about college students' Thursday drinking patterns by examining both the prevalence and quantity of drinking on Thursday relative to the other days of the week. The second goal is to assess whether the presence and timing of a beginning class on Friday are related to Thursday drinking after controlling for relevant confounders (e.g., prior drinking patterns, Greek involvement). The third is to identify whether certain subgroups are more vulnerable to class schedule effects on drinking; that is, to assess whether risk factors for problematic drinking moderate the magnitude of the Friday class effect on Thursday drinking. In this paper, we will explore how 3 specific risk factors of participant sex, Greek involvement, and precollege heavy drinking behavior interact with Friday class schedule to predict Thursday drinking.

METHOD

Participants and Procedure

Sampling Frame and Precollege Assessment—The sampling frame for the present study consisted of all first-time college students at a large Midwestern university (N = 4,226). From this, a sample of 3,720 individuals (88.0%) was ascertained in a precollege paper-and-pencil survey administered during summer orientation before college. As reported in more detail in Sher and Rutledge (2007), participants in the precollege assessment were virtually identical to the sampling frame in basic demographic data [i.e., sex, race, and American College Test (ACT) composite scores].

College Assessments—Participants in the precollege assessment were solicited for additional web-based assessments during 8 consecutive fall/spring semesters. Table 1 shows the participation rates for each semester assessment as a function of the enrolled participants in the precollege assessment. Owing to academic attrition, the number of eligible enrolled students varied from semester to semester as students withdrew and/or resumed enrollment in the institution.[1] As shown in Table 1, participation rates in the college assessments varied from 66.5 to 74.0% across semesters. Considered across all college assessments, data were obtained from 3,341 (56% female, 90% non-Hispanic white) students (90% of eligible precollege

[1]Student enrollment within a semester was operationalized using a variety of definitions: number of completed credit hours, highest number of credit hours attempted, and initial number of credit hours attempted. Analyses were largely similar across these various definitions, and analyses reported here are based on students who successfully completed at least 3 credit hours during the semester.

participants). More information concerning recruitment bias in the college assessments relative to the sampling frame and precollege assessment is reported by Sher and Rutledge (2007). Individuals who participated in the college assessments were more likely to be female (60.35–62.79%) than the entering class as a whole. Additional information concerning each semester's inclusion rates is presented in Table 1.

Assessment Procedures—Every effort was made to assess alcohol consumption during the 12th week of the fall semester and 2 weeks after spring break in the spring semester. The majority of participants completed the assessments during this time; however, data collection continued until the last week of classes in an effort to secure as many participants as possible. Each semester's assessment was conducted well into each semester to ensure that behaviors reports occurred in that semester and not before breaks or semester and were also timed so as to be roughly 4 weeks after the midterm examinations usually occur for that semester. Participants gave consent/assent for their participation and also for the release of their academic records. At the precollege assessment, participants were given a $10 bookstore voucher and, at subsequent assessments, participants were paid ($10 at semester 1, $15 at semester 2, $25 at semesters 3–8) or were given research participation credit in their Introductory Psychology course. At each follow-up assessment, additional compensation was also offered in the form of a lottery where the number and amount of cash prizes varied.

Subjects were solicited for each semester's assessment via their campus e-mail (or alternative e-mail) address and individuals who participated in the survey were required to provide identification information as part of the participant reimbursement process. In addition, we also attempted to identify individuals who were malingering in their response: time of day stamps associated with web submissions were logged and responses on pages were examined to check for patterns of random response, response that was too rapid, habituated response, or nonsensical patterned response (e.g., answering a value one more or less than the previously asked question). Data from the fall and spring semesters of the first year revealed a very small proportion of habituated or nonsensical response (only 2 individuals were identified and their values were set to missing for those assessments) and further programming to identify such a response was not undertaken. Although participants were instructed to complete the web-based assessment in a private context, there is no additional information as to how compliant participants were in this regard. Although any web-based assessment presents some difficulties with validating identity, we believe that use of students' e-mail accounts minimizes these concerns.

Measures

Day-of-Week Drinking—Participants' day-of-week drinking was assessed at each of the 8 semesters with an item that asked "In the past 7 days, how many drinks did you have each day?" Participants used a pull-down menu to indicate the number of standard drinks they had consumed each day of the week. Response options ranged from 0 to 23 drinks, with a final category of 24+ indicating 24 or more drinks during the day.

Past-3-Month Drinker Status—At each semester, participants were classified as past-3-month drinkers or past-3-month nondrinkers based on their response to an item that asked them about their use of alcohol during the past 3 months. Participants were classified as past-3-month drinkers if they indicated any amount of alcohol use during the past 3 months and as past-3-month nondrinkers if they indicated no alcohol use in the past 3 months.

Greek Involvement—Participants' involvement in the Greek system at each semester was assessed by the item "Are you a member of a fraternity or sorority?" which had the following 4 response options: (1) No, I am not a member and I never attend fraternity or sorority events

(mean of 46.43% of responses across all semesters); (2) No, I am not a member but I occasionally attend fraternity or sorority events (M = 21.49%); and (3) No, I am not a member but I regularly attend fraternity or sorority events (M = 2.63%); (4) Yes (M = 29.45%). Because of the similar patterns in mean Thursday drinks consumed for frequent attenders and members, these latter 2 groups were collapsed into a single group representing, on average, 32.08% of the sample, yielding a 3-point scale.

Precollege Reports of Being Drunk—At precollege baseline, participants were asked to indicate the number of occasions on which they had been drunk in the past 30 days. The 8 response options (ranging from reports of 0 to 7 times with an eighth response option of "8 or more times") were collapsed into 4 classes representing 0, 1, 2, or 3 or more times.

Academic Aptitude—American College Test composite score, ascertained from registrar data, was taken as an index of academic aptitude (ACT, 2007; NIH Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism, 2002a; Stumpf and Stanley, 2002).

Attempted Credit Hours—The number of college credit hours attempted within each semester was obtained from registrar report. Based on examination of the frequency distribution of this variable, it was decided to categorize this variable into 3 levels: <12 credit hours (6.6%), between 12 and 15 credit hours (79.0%), and 16 or more credit hours (14.4%). Such a categorization of credit hours gives the variable the ready interpretation of students who have less than a full course load of 4 courses, a full course load, and more than a full course load. Although most students were classified in the second category, we do not feel that more fine-grained contrasts are warranted, given that patterns of weekly and Thursday drinking within each group were similar.

Academic Schedule—Participants' academic schedules for each semester were ascertained by merging electronic copies of academic transcripts obtained from the registrar with electronic copies of course catalogue information for each semester. The presence and timing of Friday classes for each participant were determined by merging participants' web-based survey responses with their transcript information. This was in turn merged with the course catalogue information for each semester. Although most classes listed were shown with a fixed meeting time, some classes were designated as "To be Arranged." The number of such classes was related to year of study, ranging from approximately 1% of classes during the Fall 2002 (freshman) academic year to 9% of classes in the Fall 2005 (for many students, the senior) academic year. Most often, these classes were lab sections that were unlikely to be scheduled on Friday. It should be noted, however, that such unscheduled courses may result in slight overcounts of individuals with no Friday class, and slight undercounts in students who in fact have an earlier Friday class. Such a bias would, however, act so as to reduce the Friday class effect on Thursday drinking. To typify the general patterns associated with Friday class schedule, the starting time of the earliest Friday class was grouped into 5 categories: classes beginning from 8 to 9 AM, from 9 to 10 AM, from 10 to 11 AM, from 11 AM to 12 PM, and after 12 PM. If the student's schedule indicated no class convening on Friday, that student's schedule was classified as having no Friday class. A very small number of classes (<1%) in each semester reported a starting time before 8 AM and were grouped with the 8 to 9 AM time slot.

RESULTS

Participant Characteristics

The number of individuals participating in each semester of the study and the basic characteristics of these individuals are shown in Table 1. Similar statistics are also presented in the second half of Table 1 for those individuals who reported some alcohol consumption in

the past 3 months before the assessment. As can be seen, prevalence and amount of past week alcohol consumption patterns increased over the semester assessments, with the largest increase occurring between the second and third year of college. This increase is most likely due to the fact that the third and fourth years of the study are associated with attainment of legal age for alcohol consumption for most participants.

Academic schedules for all participants (as well as only past 3-month drinkers) revealed that roughly a third to a half of the students had late Friday classes (37.90–53.00% for all participants) and that the proportion of students having no Friday classes increased across semesters, from 0.5% during the fall semester of 2002 to 37.9% in the spring semester of 2006. As shown in Table 1, the percentages of students at each measurement occasion who had late (i.e., after 10 AM) or no Friday classes are roughly the same, whether based on individuals who self-identified as drinkers in the past 3 months or based on all available participants.

Day-of-Week Drinking Patterns

General patterns of day-of-week consumption for each semester are given in Fig. 1 and Fig. 2. In addition to the previously well-documented finding of alcohol consumption on the weekends, the proportion of men and women who consume at least 1 drink on Thursday is shown to increase across the semesters of the study. The average number of drinks consumed on Thursday is dramatically higher than for earlier days of the week across all semesters as well. The higher proportions of men who consume at least 1 drink and the higher average number of drinks consumed by men are also noteworthy.

Effect of Friday Class Schedule on Thursday Alcohol Consumption

In general, the raw means associated with the number of drinks consumed as a function of early Friday class schedule demonstrated a clear effect for Friday classes: students whose first Friday classes started at 8 AM or earlier consumed the least on Thursday night (M = 1.24 drinks), those whose classes started at 9 AM also consumed relatively little (M = 1.39 drinks), and those with later classes tended to consume increasingly more (10 AM, M = 1.82 drinks; 11 AM, M = 2.15 drinks; 12 PM or later, M = 2.52 drinks). Students with no scheduled Friday class consumed 2.41 drinks. In a manner similar to the sex differences found in consumption by day of week reported in Fig. 2, men, who reported consuming more drinks on average on Thursday, also seemed to demonstrate larger differences in the number of drinks consumed as a function of Friday class schedule, as shown in the top half of Fig. 3.[2]

The pattern of Thursday alcohol consumption as a function of Friday class schedule is also similar for those students who report being drinkers in the past 3 months: as shown in the left-most column of Table 2, the proportion of students drinking at least 1 drink on Thursday varies as a function of the starting time of the first class on Friday, such that men and women evidenced higher prevalence rates of drinking when their Friday classes started at later times. The average number of drinks consumed by those students who drink at least 1 drink on Thursday is shown in the middle column of Table 2 and documents both the high average consumption patterns of students who drink as well as the differences in consumption as a function of the starting time of first Friday class. Another way to document heavy alcohol consumption in students who drank at least 1 drink Thursday is to calculate the proportion of students who met criteria for “binge” drinking for that day (operationalized for men as consuming 5 or more drinks and for women as consuming 4 or more drinks in a single sitting) (Wechsler et al., 1994). Roughly 16 to 18% more men and 8 to 11% more women were likely to consume binge amounts of alcohol if the starting time of their first Friday class began after 11 AM, rather than beginning

[2]Patterns of means by sex, Greek participation, and class schedule reported in Fig. 3 are similar when based on only those individuals who self-report that they were drinkers in the past 3 months.

before 11 AM Also, 12% more men and 15% more women were likely to consume binge amounts of alcohol if they had no Friday class as opposed to an early Friday class.

To assess whether the starting times of students' first Friday classes affect drinking behavior on the previous Thursday night and whether this effect was either differential or could be explained by reference to participant sex, participation in Greek activities, number of attempted credit hours, and student grade or year level, a multilevel model using Proc Mixed was specified. In this model, within-person effects were specified for year (both linear and quadratic) and semester and between-subject effects were specified for participant sex, participation in Greek activities, precollege reports of being drunk, and number of credit hours attempted. Interaction effects were also modeled for Greek participation by sex, sex by precollege reports of being drunk, Greek participation by precollege reports of being drunk by sex, as well as interaction effects for Friday classes by sex, by Greek participation, and by both sex and Greek participation. Estimation of a fully crossed model was not possible due to an estimated infinite likelihood in Proc Mixed. Selection of the modeled interaction effects was guided by an examination of the raw means.

The AIC and SBIC fits for the resulting model were 82,675.3 and 83,254.5, respectively. In the model, within-subject random effects associated with intercept and year were statistically significant, while the overall effect of semester was not ($p = 0.12$), indicating that linear patterns of change in drinking behavior over the years of the study were a significant individual difference variable.

Between-individual effects were found for scheduled Friday class [$F(5, 15E3) = 18.12$, $p < 0.001$], number of times drunk precollege [$F(3, 3,280) = 274.33$, $p < 0.001$), sex [$F(1, 3,287) = 231.91$, $p < 0.001$], and Greek participation [$F(2, 7,612) = 95.61$, $p < 0.001$], but not for semester credit hours attempted [$F(2, 16,000) = 0.071$, $p = 0.4925$]. Interactions between Friday classes and sex were found [$F(5, 15E3) = 5.10$, $p < 0.001$], between Greek participation and Friday classes [$F(10, 15E3) = 3.31$, $p < 0.0003$], between Greek participation, sex, and Friday classes [$F(10, 15E3) = 3.02$, $p < 0.0008$], and between Friday classes, sex, and number of times drunk precollege, although this last interaction was barely significant [$F(30, 15E3) = 1.51$, $p = 0.0372$]. Interactions between Greek participation and sex were found [$F(2, 7,591) = 13.35$, $p < 0.001$], as well as sex and number of times drunk precollege [$F(3, 3,280) = 8.55$, $p < 0.001$] and Greek participation by sex by number of times drunk precollege [$F(12, 6,871) = 1.95$, $p = 0.0248$]. We note that this last interaction was largely typified by a pattern of strong Friday class effects for men as a function of number of times drunk, with students who reported being drunk 3 or more times per month precollege reporting consumption of more drinks on Thursday if they had no Friday scheduled class. In the interests of typifying the largest interactions involving scheduled Friday classes, however, we focus our discussion on the sex by Friday class interaction and the Greek participation by sex by Friday class interaction.

Adjusted least square means and the 95% confidence intervals for the average number of Thursday drinks consumed as a function of Friday class are given in the bottom half of Fig. 3. As can be seen from the figure, men generally report consuming more drinks on Thursday night than women and the magnitude of the Friday class effect for men is more pronounced than for women, although it is present for both sexes.[3]

When the sex by Greek participation by Friday class interaction was explored, it was found that women's least square means as a function of Greek participation and Friday class were not different from each other. For men, by contrast, the starting times of first Friday class

[3]Patterns of statistical significance and the general magnitude differences in least squares means were similar when analyses were based on only individuals who self-identified as past 3-month drinkers.

appears to have a graded effect as a function of participation in Greek activities: nonparticipants in Greek events show a reduced level of alcohol consumption for classes starting between 8 and 11 AM; for occasional participants, this effect is present only between 8 and 10 AM, and for frequent participants/members, this effect is present only for classes that start between 8 and 9 AM. The average number of drinks consumed on Thursday for men who have no scheduled Friday class shown in the top half of Fig. 4 appears to increase as a function of level of Greek participation, whereas the least square means for this effect shown in the bottom half is not as dramatic, suggesting that a portion of the contrast associated with raw means may be due to other factors in the multilevel model.

Academic Attrition as an Alternative Explanation—It is possible that the observed association between Friday classes and alcohol consumption is, in part, an artifact of general academic attrition. Those students who have early Friday classes may be representative of a different type of student than those who do not in terms of their general level of academic aptitude, academic major, academic persistence, or other student characteristics. Although as mentioned in the discussion below, such alternative explanations are most effectively dealt with by means of a controlled experimental intervention, we attempted to address the degree to which the Friday class effect represents an intraindividual, as opposed to an interindividual effect by rerunning the multilevel model described above based on only those individuals who, over the course of the study, had both a scheduled early Friday morning class at some point in the study and had either a late morning Friday class or no scheduled Friday class at some point in the study. This analysis replicated the patterns of statistical significance found in the full multilevel described above, specifically through the main effect for Friday classes [$F(5, 12E3) = 13.01$, $p < 0.001$], the Friday class by sex interaction [$F(5, 12E3) = 5.30$, $p < 0.001$], the Greek participation by Friday class interaction [$F(10, 12E3) = 2.84$, $p < 0.001$], and the Greek participation by sex by Friday class interaction [$F(10, 12E3) = 2.77$, $p = 0.002$]. The interaction of precollege report of number of times drunk by sex by Friday classes was somewhat stronger than in the original analysis [$F(30, 12E3) = 1.73$, $p = 0.0079$]. As a result, we concluded that the observed Friday class effect was more likely attributable to the actual timing of the class and that it was less likely attributable to unmodeled confounding variables associated with differential attrition.

Other Determinants of Academic Class Schedule—Although the previous analysis addressed whether the observed relationship between Thursday drinking and academic class schedule could be considered an artifact of between-subject characteristics, the degree to which a student's class schedule may be influenced by the independent variables in the multilevel model is also of interest. To assess this possibility, we re-specified the model as a 2-level model in Mplus (Muthén and Muthén, 1998–2006), in which Friday class schedule was specified as an ordered polytomous variable and in which both Thursday drinks and Friday class schedule were specified as dependent variables and interaction effects found in the Proc Mixed multilevel model were effect-coded. In addition, it was decided to include ACT composite as an additional predictor variable to control for the possibility that more academically able students might be given preferential admission to the classes of their choice. This analysis replicated the main effects and interactions found in Proc Mixed, but yielded additional insights into the determinants of Friday class schedule as well.

Specifically, early Friday classes were more often associated with earlier grade or year levels in college and were more frequent in the fall rather than spring semesters. In terms of student characteristics typical of those who had later or no, as opposed to earlier Friday classes, students with later classes were more likely to be male, more likely to be Greek members, and more likely to report precollege episodes of being drunk. There were no significant interaction effects and no statistically significant effect of ACT composite on Friday class schedule.

"Catch-Up" Drinking—It is also possible that the observed reduction in Thursday drinking could merely represent a shifting of the day of the week that alcohol is consumed. There would be limited practical benefit of scheduling early morning Friday classes for students, if, for example, students merely redirected their alcohol consumption to Friday or Saturday if they had an early scheduled Friday class. To assess this possibility, we conducted analyses analogous to those reported for Thursday drinking but based instead on the sum of the number of drinks reported on Friday and Saturday, the 2 days of the week most associated with alcohol consumption. This analysis revealed no main effect associated with Friday class schedule [$F(5, 15E3) = 1.04$, $p = 0.3912$], but statistically significant interactions between participant sex and Friday class schedule [$F(5, 14E3) = 3.80$, $p = 0.002$], Greek participation and early Friday class [$F(10, 15E3) = 3.21$, $p < 0.001$], as well as a significant Greek participation by sex by Friday class interaction [$F(10, 15E3) = 2.80$, $p = 0.002$]. Least squares means for Friday and Saturday consumption as a function of total drinks on Friday and Saturday are given in Fig. 5. Examination of the least squares means associated with Friday class by sex revealed no differences as a function of Friday class schedule for either men or women except for the fact that the means trend in opposite directions. For men, the least square means for a starting class at 10 AM and for having no Friday class were 0.82 drinks greater than the mean for those who had an 8 AM or earlier class. For women, the largest difference was 0.33, with women who have early classes tending to drink less than those with later classes. We interpret this interaction as detecting a slight difference in the means between men and women as a function of Friday class schedule, but note that these differences are nowhere near the magnitude of Thursday drinks consumed as a function of sex given in Fig. 3. Turning to the sex by Greek participation by Friday class participation interaction, means for men within level of Greek participation were largely similar as a function of class schedule, except that, for men who were occasional participants in Greek activities, the average Friday and Saturday drinks consumed for those who had no scheduled Friday class was 2.96 drinks more than for those with scheduled Friday classes. Men who were either members or frequent participants in Greek activities evidenced slightly higher levels of drinking on Friday and Saturday. Given that the means of Friday and Saturday consumption were flat as a function of scheduled Friday class, it appears that the phenomenon of catch-up drinking, if at all present, is limited (Fig. 6).

DISCUSSION

In the vast college student drinking literature, there is likely no speculation that has been advanced without supportive data more than the idea that the absence of Friday classes (or at least the absence of Friday morning classes) promotes drinking on Thursday evening. Indeed, empirical evidence for the "thirsty Thursday" effect has been, except for the 2 studies noted, scant. Our study not only demonstrates a large increase in Thursday drinking over drinking on previous days of the week, effectively lengthening the weekend and likely drinking days, but also demonstrates that this effect appears to be a function of class schedule, and is both robust to statistical controls for likely confounders and replicable within subjects.

Our data represent a refinement of the finding of Paschall et al.'s (2006) finding that students with heavy alcohol consumption patterns are less likely to enroll in Friday classes. These data suggest that not only are heavy-drinking students less likely to have a Friday class as Paschall and colleagues found, they are also more likely to attempt to enroll in classes that convene later in the day. These data are in marked contrast, however, to Paschall and colleagues' conclusion that there was no evidence for a Friday class effect after adjusting for prior alcohol use. Several explanations are possible for the discrepancy: we note that the proportion of freshmen having no Friday class in the Paschall and colleagues' study (11%) was substantially higher than for the freshmen reported in these data (0.5 and 1.4% for the fall and spring semesters, respectively) and that the 54.2% of students who reported drinking on Thursday in the Paschall and colleagues' study is substantially higher than that reported in the top half of Fig. 1. The Paschall

and colleagues' study examined only the presence/absence of Friday classes, does not report whether interaction effects were considered in the models, and were based on a somewhat smaller sample ($N = 866$) of students who were predominantly freshmen. Thus, the discrepancy in findings could be due to cultural and institutional differences, increased precision in assessment of Friday class schedule, more precise modeling of differential effects of the Friday class effect for at-risk groups, or increased statistical power due to the sample size and data analytic approach considered here.

The Friday schedule effect was evident in analyses comparing early (i.e., before 10 AM) versus later (after 12 PM) scheduled classes and in analyses comparing early scheduled classes and no Friday classes, although the magnitude of the effect appears to be greater for comparisons where no Friday class is scheduled. It is also important to highlight that these effects of class schedule occur even when controlling for a host of other variables known to be associated with hazardous drinking including precollege heavy drinking, involvement in Greek activities, and number of attempted credit hours.

Additionally, the demonstration of this effect within-students over time (in addition to across students) increases confidence that these effects are not simply attributable to heavier-drinking students selecting more "drinking compatible" course schedules (i.e., reverse causation) although such selection undoubtedly occurs, especially as students have increasing freedom in their scheduling of classes in their later years of schooling. Additionally, the within-subject findings also demonstrate that the association is unlikely to be spurious, that is, accounted for by some unmeasured third variable (e.g., general deviance, impulsivity) that would be expected to be stable over time.

Although the findings across type of analysis are fairly robust, especially for those analyses involving the absence of Friday classes, it is important to note that the magnitude of this effect varies as a function of Greek involvement in men, at least in the between-subject analyses that are based upon the most inclusive sample representing one or more follow-up assessments in approximately 90% of the baseline sample. As shown in Fig. 3, the Friday class schedule effect was much greater for men who were not involved in fraternity life. For these men, early morning classes were associated with very low levels of consumption (on average, 1–2 drinks) on Thursday but lack of Friday classes was associated with high rates of consumption. Although a similar pattern of findings is found for Greek men, it is much more muted; only very earlier classes are associated with reduced consumption and these levels of consumption are still very high compared with those who are not Greek members. It seems that Greek life creates a sufficiently compelling social drinking environment that overwhelms the inhibitory effects of class schedule.

At least 2 related and straightforward mechanisms based on role incompatibility could be hypothesized to explain the relation observed here. First, the prospect of having to attend class the next morning has sufficient inhibitory influence to suppress drinking on Thursday. That is, attendance at an early morning class is incompatible with hangover or other adverse consequences of a night of drinking. In this case, it is not the time spent drinking that is incompatible with class attendance, but rather drinking's aftermath. However, the time spent drinking itself more often represents the key aspect of role incompatibility. For example, if a class has assigned homework and meets early on Friday morning, the procrastinating student may need to spend all or part of Thursday evening preparing for Friday morning's class. In this case, the issue is not so much dealing with the aftermath of drinking but rather, not having sufficient opportunity to go out drinking. Our study was not designed to assess either of these simple mechanisms and so it is not possible to determine the relative importance of these 2, related processes. Ideally, more intensive, research designs where participants' drinking

decisions are assessed on a frequent basis (e.g., daily or more) would allow us to isolate those specific attributes of class schedule that inhibit or promote drinking.

However, the preventive implications of these 2 mechanisms differ only slightly. While both support the potential value of "reclaiming Friday" by scheduling more classes on Friday, especially Friday before 10 AM, the latter mechanisms suggest that regular homework assignments can also potentially have salutary effects on drinking rates. Although making Thursday drinking more "costly" to students by imposing "real-world" constraints on drinking opportunities logically follow, until an intervention is actually implemented in the context of controlled research, it is impossible to determine whether the desired outcome would be achieved. It should be noted that there are additional reasons beyond effects on drinking that could motivate university officials to schedule classes more often on Friday. Perhaps the most important reason is that by not optimally utilizing the existing classroom inventory, there is a need to build more classrooms than would be required otherwise (Young, 2003).

Regardless of how compelling a case could be made in support of increased Friday classes, instituting such changes can be extremely difficult because of both faculty and student preferences. As noted by (Young, 2003), producing a workable institutional schedule itself is often a difficult task at many institutions; faculty and students alike express the need for one unscheduled day a week: faculty often cite the need to travel to conferences or conduct research and students often express the need for large slots of time to pursue internships, travel on athletic or academic teams, and work to support themselves during college.

Limitations

Although this study is, to our knowledge, the first to directly examine the relationship between the timing of academic class schedule and daily drinking patterns, the fact that these data are based on self-reported drinking behavior for a relatively brief period, based on a single institution, and rely on transcript data (which might not reflect instructor-directed variances in class meeting times; see below) all present limitations for the interpretation of results. Additionally, nonparticipation at one or more measurement occasions can potentially affect our estimates of various effects. As noted earlier, women were, on average, more likely to participate in the study than men. As a result, the average consumption levels and prevalence of alcohol consumption are likely an underestimate of the levels associated with the campus as a whole.

Although we believe that the use of transcript data, which by its very nature is "objective," represents a strength of our study, any university's academic schedule of classes is a less than perfect operationalization of students' actual schedules. A small number of classes in the schedule were not assigned a meeting time when the class schedule was published and, as noted earlier, the effect of such missing data is to make the observed Friday class effect found here a slight underestimate of the actual Friday class effect. In addition, student truancy from inconveniently scheduled classes may also mean that the observed effect found here is an underestimate of the early Friday class effect actually associated with *attending* a scheduled early Friday class. The present study did not assess student attendance in the previous week but we suspect that skipping class may account for the slightly smaller early Friday class effect found for men relative to women. Students are not the sole authors of change to an inconvenient instructional schedule: we have also received informal reports that some instructors of early Friday classes fail to convene the class at the stated time. Instructors, for example, may elect to convene the class later than scheduled, informally lengthen class times on other days to cancel their Friday class time altogether, use the Friday class time as a "study session" period for students who experience difficulties with course material, or reward students for performance by occasionally canceling Friday classes altogether. Although such changes to early Friday class schedules are not the norm, there is no formal record of these changes to

draw upon. It seems fair to note, however, that these behaviors are likely more typical of smaller enrollment, advanced classes and to note that skipping class and instructor-initiated changes to the class schedule serve to make the Friday class effects found here an underestimate of the actual effect.

Although participation rates varied at each follow-up occasion (ranging from 68 to 75%), our use of a hierarchical linear model approach was able to exploit the high cumulative participation rate, minimizing retention bias. Although we believe that our overall between-subject analyses represent the best estimates of the class schedule effect, it is potentially biased by selection factors (heavier drinking selecting more drinking-conducive schedules). Although the within-subject analyses effectively remove such between-subject confounding, the smaller subset of participants met inclusion criteria for these analyses and they may be less than representative of the population of interest. Thus, we find that the primary utility of the within-subject analysis is to demonstrate that class schedule effects can be demonstrated in the absence of between-subject confounding, not to provide a careful estimate of the effect.

The assessed magnitude of the Friday class effect in individuals who self-identify as drinkers (as shown in Table 2) appears to be slightly reduced relative to Friday class effect based on all individuals (shown in Fig. 2). Although the magnitude of the Friday class effect is largely the same for men in both cases, it appears that the Friday class effect is less pronounced for women who identify as drinkers (here it is roughly 0.6 of drink) rather than women as a whole (where it is roughly equal to a drink). This discrepancy may be an artifact of the generally lower patterns of alcohol consumption among women or could reflect a more general decision on the part of women to simply not drink in a given semester, given their academic schedule.

CONCLUSION

Despite these limitations, the present study represents an important first step in estimating day-to-day consumption patterns in alcohol use in a large-scale prospective study of undergraduates. The observed patterns of alcohol use as a function of academic class schedule do not seem attributable to the more commonly documented risk factors for alcohol use in this population, and the basic association between Friday class schedule and Thursday night drinking was observed within subjects (which controls for between-subject confounders) as well as between subjects with risk factors statistically controlled.

It goes without saying that some students are reluctant to take early Friday classes (or any Friday class at all), and that instructors are often reluctant to teach Friday classes. This could be for extracurricular reasons (e.g., faculty consulting) or for classroom-related reasons (e.g., because Friday classes are unpopular and more prone to truancy). It would appear, based on these observational data, that early Friday classes represent a cost-effective way to reduce alcohol consumption on campus, and controlled evaluations of altering the class schedule should be undertaken. In addition to the positive public health implications of scheduling early Friday classes, a substantial increase in the efficiency of the physical plant of the university would result as well, given that classes could be more evenly scheduled across available classrooms on campus (NIH Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism, 2002a, 2002b).

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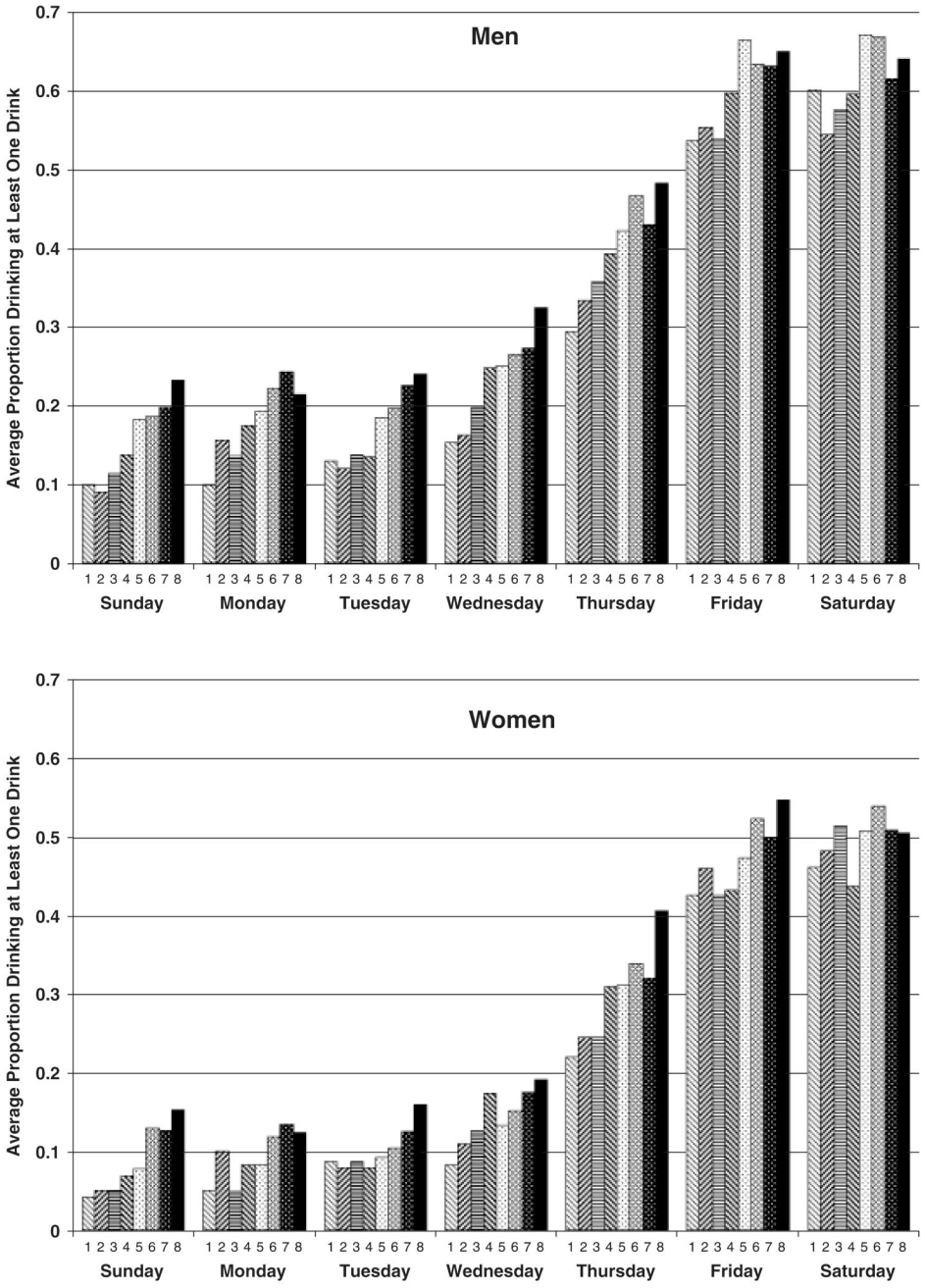

Fig. 1.

Average proportion of students drinking at least 1 drink as a function of day of the week and semester.

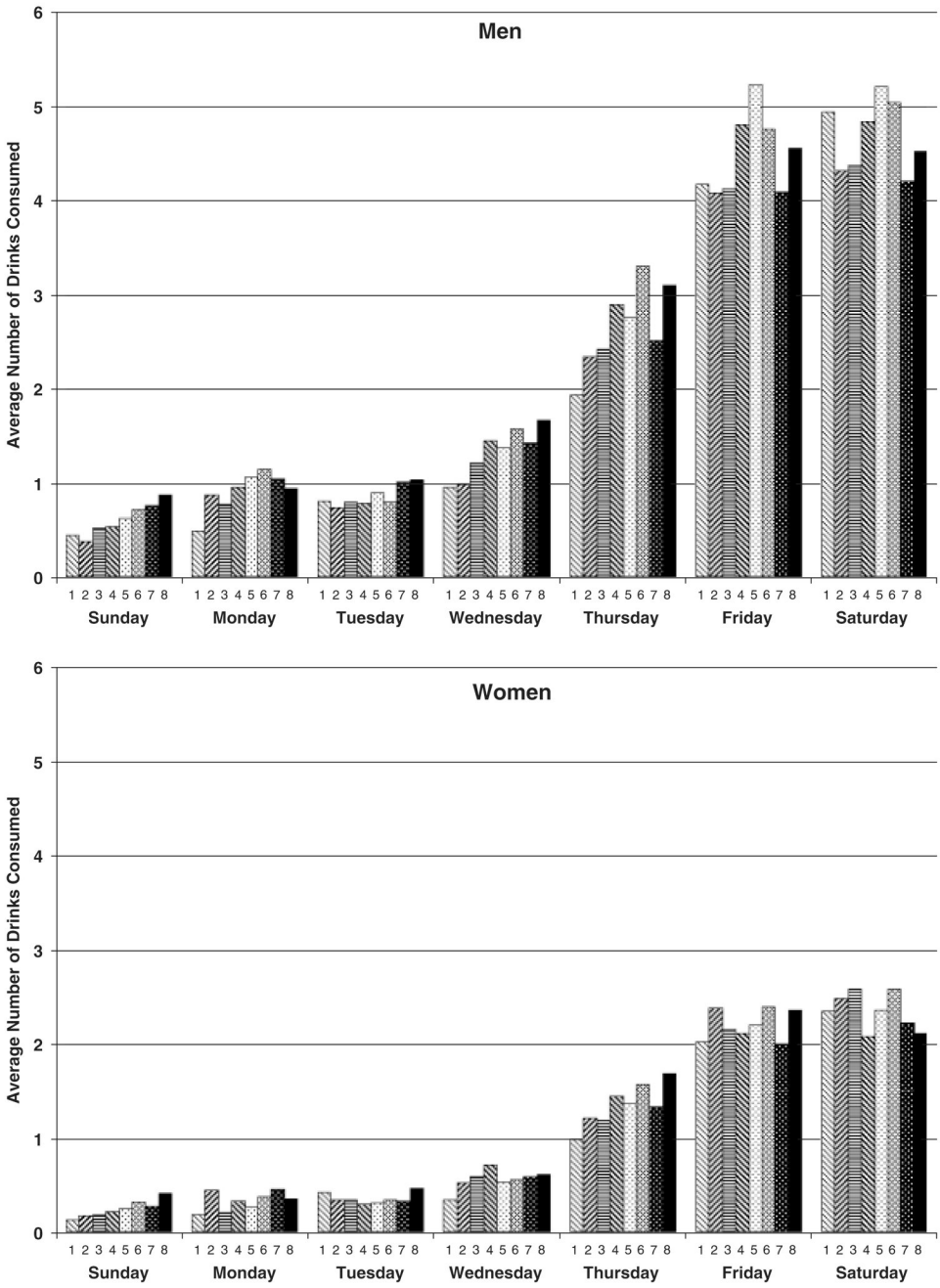

Fig. 2.
Average number of drinks consumed as a function of day of the week and semester.

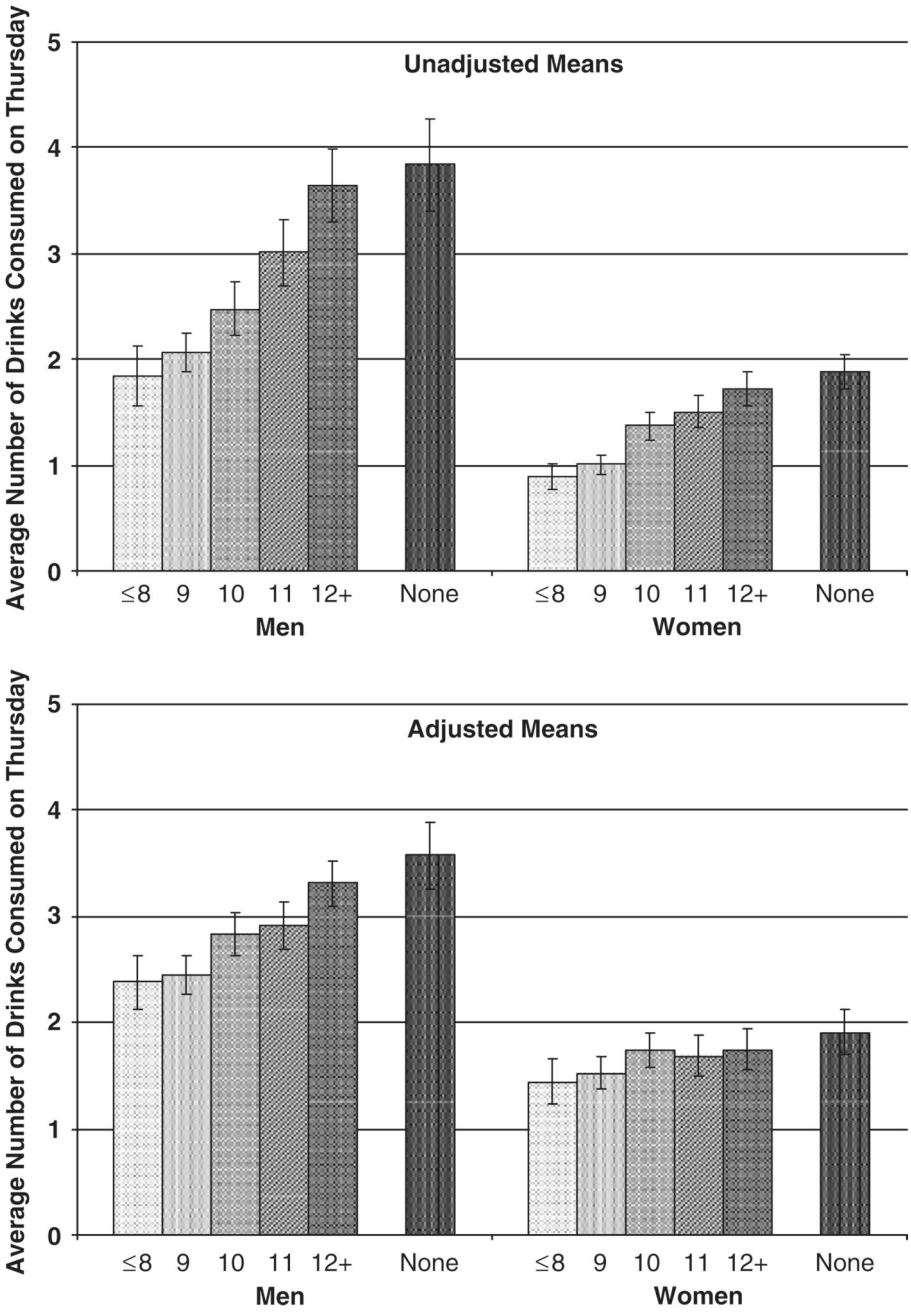

Fig. 3.
Effect of earliest Friday class on average number of Thursday drinks by sex.

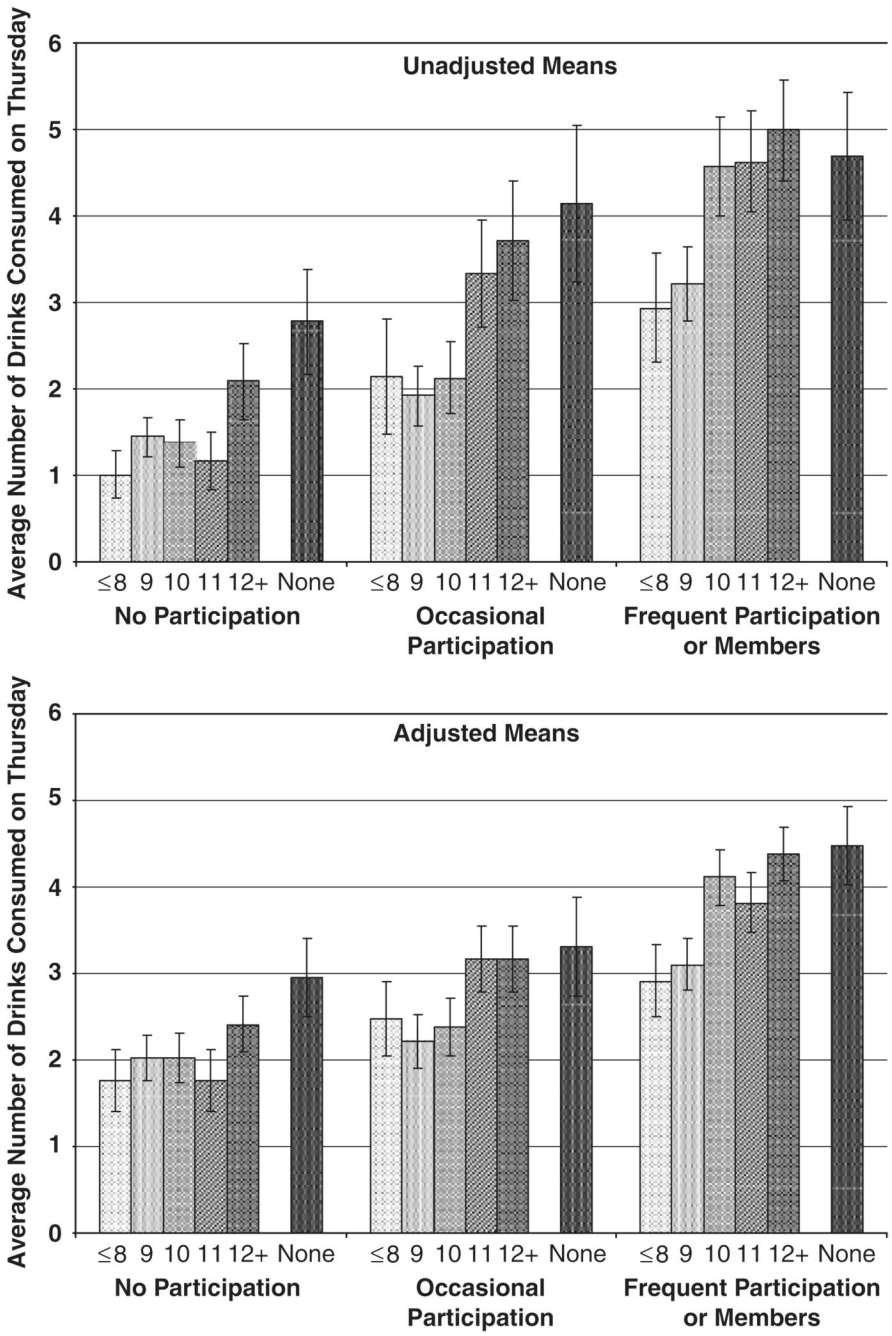

Fig. 4.

Effect of earliest Friday class on average number of Thursday drinks for men as a function of participation in Greek activities.

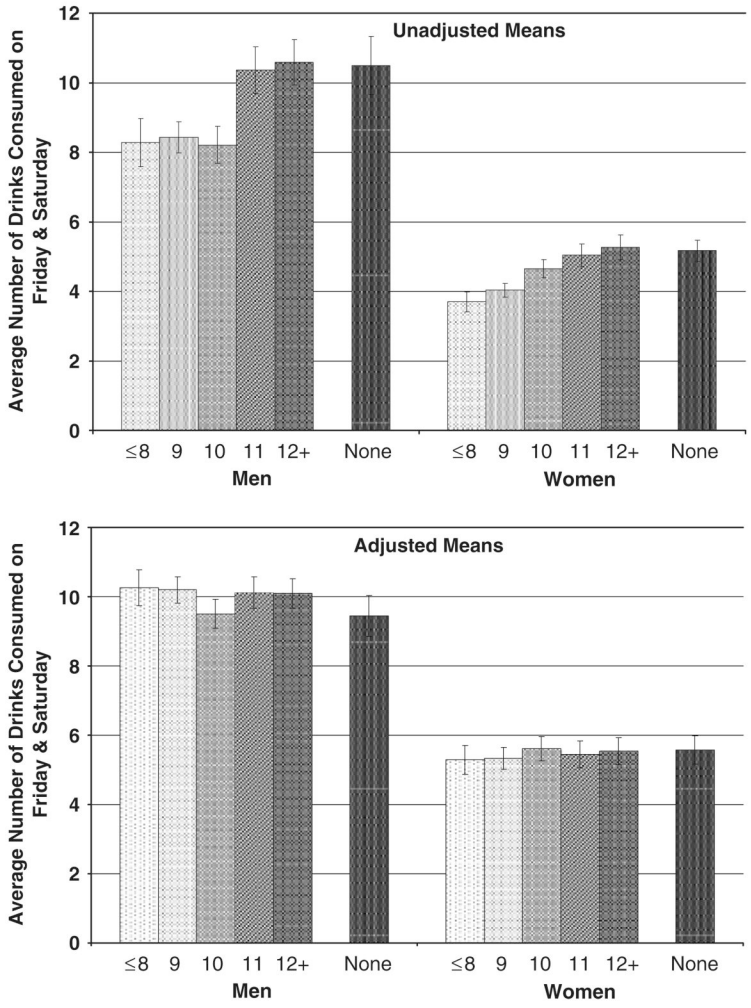

Fig. 5.
Effect of earliest Friday class on average number of Friday and Saturday drinks by sex.

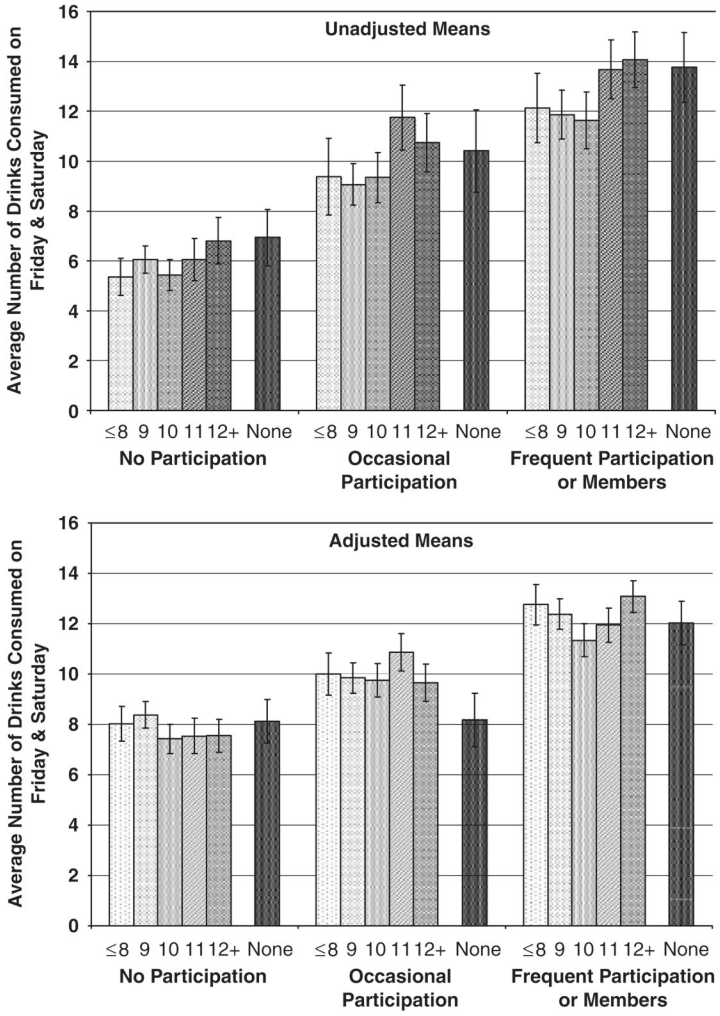

Fig. 6.

Effect of earliest Friday class on average number of Friday and Saturday drinks for men as a function of participation in Greek activities.

Table 1

Descriptive Statistics for Complete Study Sample (Drinkers and Nondrinkers) and for Drinkers Only

	Semester							
	Fall 2002	**Spring 2003**	**Fall 2003**	**Spring 2004**	**Fall 2004**	**Spring 2005**	**Fall 2005**	**Spring 2006**
Total Number of enrolled eligible students[a]	*n* = 3,713	*n* = 3,509	*n* = 3,165	*n* = 3,012	*n* = 2,899	*n* = 2,754	*n = 2,746*	*n = 2,599*
Participants ascertained (*n* = 3,341)	*n* = 2,570	*n* = 2,425	*n* = 2,104	*n* = 2,217	*n* = 2,097	*n* = 2,004	*n = 2,031*	*n = 1,809*
Sample as percent of total enrolled	69.2	69.1	66.5	73.6	72.3	72.8	74.0	69.6
Baseline variables								
Female (%)	61.4	62.3	62.8	60.4	61.7	60.4	60.7	60.7
Precollege drinker (%)	79.2	78.8	78.5	78.5	78.3	78.0	78.8	78.5
Greek Involvement								
Greek members/frequent participants (%)	28.8	30.4	32.0	33.1	32.0	30.8	30.1	29.1
College alcohol consumption								
Past-3-mo drinker (%)	78.9	77.9	80.6	80.4	85.8	88.7	91.6	91.9
Past-7-d drinker (%)	57.3	59.0	61.2	62.8	69.8	73.7	76.4	76.6
Past Thursday drinker (%)	20.0	23.2	24.3	28.2	31.1	35.1	35.0	40.4
Friday class schedule								
No Friday class (%)	0.5	1.4	3.2	4.9	10.3	18.0	26.6	37.9
Late (10:00+ AM) Friday class (%)	48.6	52.5	53.0	47.3	43.9	46.4	38.8	37.9
Past-3-mo drinkers (n = 3,149)	*n* = 2,025	*n* = 1,884	*n* = 1,688	*N* = 1,768	*N* = 1,784	*n* = 1,759	*n = 1,830*	*n = 1637*
Baseline variables								
Female (%)	62.0	62.7	63.3	60.7	62.0	61.3	61.6	62.0
Precollege drinker (%)	91.8	91.3	88.8	88.4	85.1	82.9	81.2	81.1
Greek involvement								
Greek member/frequent participants (%)	34.0	35.8	36.9	38.3	34.9	32.5	31.2	30.1
College alcohol consumption								
Past-7-d drinker (%)	71.0	73.0	73.0	75.5	80.2	82.8	83.0	83.0
Past Thursday drinker (%)	24.8	27.8	28.7	34.3	35.3	38.8	39.8	43.5
Friday class schedule								

	Semester							
	Fall 2002	**Spring 2003**	**Fall 2003**	**Spring 2004**	**Fall 2004**	**Spring 2005**	**Fall 2005**	**Spring 2006**
No Friday class (%)	0.5	1.4	3.3	4.4	10.0	18.1	26.6	37.7
Late (10:00+ AM) Friday class (%)	49.1	54.8	54.9	49.7	44.2	46.5	39.1	38.3

[a]Three thousand seven hundred twenty individuals attempted at least 3 credit h. Seven individuals provided no report of precollege episodes of being drunk, resulting in a base pool of 3,713 for the multilevel models described here.

Table 2

Proportion of Past 3-Mo Drinkers Who Drink on Thursday and Average Number of Drinks Consumed on Thursday as a Function of Friday Class Schedule Across All 4 y

	Proportion drinking at least 1 drink		Average number of drinks consumed by students who consumed at least 1 drink on Thursday		Proportion of students consuming at least 1 drink Thursday who met binge drinking criteria on Thursday	
Starting time of first class on Friday	**Men**	**Women**	**Men**	**Women**	**Men drinking 5+ drinks**	**Women drinking 4+ drinks**
8 to 9 AM	31.21	21.05	5.92	4.24	53.88	55.80
			(4.41)[a]	(2.56)		
9 to 10 AM	34.50	23.85	6.01	4.20	57.59	57.80
			(4.06)	(2.53)		
10 to 11 AM	38.10	29.56	6.50	4.62	63.24	62.47
			(4.25)	(2.80)		
11 AM to 12 noon	42.16	31.67	7.25	4.76	71.73	63.94
			(4.18)	(2.80)		
12 PM or later	47.94	35.58	7.62	4.84	69.86	67.18
			(4.83)	(2.77)		
No Friday class	54.38	42.78	7.05	4.40	65.92	59.14
			(4.40)	(2.83)		

[a]Number in parenthesis indicates standard deviation.