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Trends in alcohol-related traffic risk behaviors among college students

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Abstract

Background: Alcohol-impaired driving is a major public health problem. National studies indicate that about 25% of college students have driven while intoxicated in the past month and an even greater percentage drive after drinking any alcohol and/or ride with an intoxicated driver. The purpose of this investigation was to examine the change in these various alcohol-related traffic risk behaviors as students progressed through their college experience.

Methods: A cohort of 1,253 first-time first-year students attending a large, mid-Atlantic university were interviewed annually for four years. Repeated measures analyses were performed using generalized estimating equations (GEE) to evaluate age-related changes in prevalence and frequency of each behavior (i.e., ages 19 to 22).

Results: At age 19, 17% $_{wt}$ of students drove while intoxicated, 42%$_{wt}$ drove after drinking any alcohol, and 38%$_{wt}$ rode with an intoxicated driver. For all three driving behaviors, prevalence and frequency increased significantly at age 21. Males were more likely to engage in these behaviors than females. To understand the possible relationship of these behaviors to changes in drinking patterns, a post-hoc analysis was conducted and revealed that while drinking frequency increased every year, frequency of drunkenness was stable for females, but increased for males.

Conclusions: Alcohol-related traffic risk behaviors are quite common among college students, and take a significant upturn when students reach the age of 21. Prevention strategies targeted to the college population are needed to prevent serious consequences of these alcohol-related traffic risk behaviors.

Keywords

Alcohol-impaired driving; College students; Epidemiology; Longitudinal study; Young adults

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Introduction

Alcohol-impaired driving and resultant motor vehicle crashes are a major public health problem in the U.S., resulting in 13,000 preventable deaths annually [National Highway Traffic Safety Administration (NHTSA), 2008]. College students are an important population to target for several reasons. National data on motor vehicle crashes indicate that alcohol involvement is especially prevalent in drivers under 35 years of age (NHTSA, 2008). As a younger subset of the young adult population, college students could be at greater risk because they have less driving experience, and moreover, binge drinking and other risky alcohol-related behaviors are highly prevalent among college students (Hingson et al., 2002; Wechsler et al., 2002).

Alcohol consumption and alcohol-impaired driving begin fairly early in life and appear to be established well before students enter college. Almost one half (43%) of high school seniors report having used alcohol in the past 30 days, and 28% have been drunk (Johnston et al., 2009). National estimates of past-month drinking and driving among high school students range between 13.9% and 17% (Escobedo et al., 1995; Nelson et al., 2009; O'Malley and Johnston, 2007). As many as 20% of high school seniors have ridden with a driver who had been drinking and 26% either drank and drove or rode with a drinking driver in the past two weeks (O'Malley and Johnston, 2007).

Numerous studies describe the prevalence of alcohol-related traffic risk behaviors in college students. National data indicate that nearly one-quarter of college students have driven while under the influence of alcohol in the past 30 days (Everett et al., 1999; Hingson et al., 2002), which translates to more than 2 million college students engaging in this behavior. Other college student studies have produced prevalence estimates ranging from 23% to 32% (Beck et al., 2008; Clapp et al., 2005; Rothman et al., 2008). Other alcohol-related traffic risk behaviors appear even more prevalent. For example, nationally, an estimated 38.9% of college students rode with a driver who had been drinking in the past month (Hingson et al., 2002). In one college student sample, 41% drove after drinking any alcohol and 35% rode with a drinking driver, in the past six months (Zakletskaia et al., 2009).

Important sex differences are apparent in alcohol-related traffic risk behaviors. Although the gender gap with alcohol use disorders in the general population is closing (Keyes et al., 2008; Wagner and Anthony, 2007), men appear more likely to drive under the influence of alcohol and drive after drinking any alcohol, while there have been mixed findings on riding with an intoxicated driver (Calafat et al., 2009; Finken et al., 1998; Marelich et al., 2000; Schwartz, 2008). Accordingly, national crime data indicate that the vast majority of arrests for driving under the influence of alcohol occur among men, at a ratio of approximately four to one (Tyson, 2009). However, these data reveal an increase in the number of arrests for women, even as declines were observed for men, raising the possibility that the gender gap on alcohol-related traffic risk behaviors might be closing, especially among drivers with lower BAC levels (Schwartz, 2008).

Despite the wealth of cross-sectional data, longitudinal data on alcohol-related traffic risk behaviors are scarce. To our knowledge, no investigation has documented how alcohol-related traffic risk behaviors change as young adults move through their college career. Therefore, the primary purpose of this study was to examine the prevalence of three alcohol-related traffic risk behaviors during college—namely, driving while intoxicated, driving after drinking any alcohol, and riding with an intoxicated driver. Secondly, we examined sex differences across these measures over time.

Materials and Methods

The data for this study were derived from the College Life Study (CLS), a longitudinal study of a cohort of undergraduate college students that focused on understanding the natural history and consequences of alcohol and drug use and other health risk behaviors during the transition to adulthood. Sampling occurred in two stages. First, a screening instrument was administered to 3,401 incoming first-time first-year students (89% response rate), ages 17 to 19, who attended new student orientation sessions in the summer of 2004 at one large, public university in the mid-Atlantic region. Our sampling frame therefore, represented 81.8% of the entire eligible first-year class. A second stage sample was then chosen for longitudinal follow-up. Specifically, screener participants who used an illicit drug prior to college entry were oversampled. From the 1,449 participants for whom contact was made, 1,253 (86.4%) chose to participate in the longitudinal study. These individuals were then assessed annually with a personal interview by an extensively trained interviewer and completion of self-administered questionnaires. The first assessment, lasting approximately two hours, occurred at some point during their first year of college ("baseline" assessment), and covered a wide range of topics such as demographics, family and peer variables, drug use, and mental health. Annually thereafter, participants were re-interviewed in-person or over the phone in follow-up assessments that were similar in content and format to the baseline assessment. Participants received $5 for completing the screening survey, $50 for personal interviews, plus a $20 bonus for on-time completion of follow-up assessments. Follow-up rates were high: 91% in Year 2 (n=1,142), 88% in Year 3 (n=1,101), and 88% in Year 4 (n=1,097). Informed consent was obtained under IRB-approved protocols for participation in all phases of the longitudinal study, and a federal Certificate of Confidentiality was obtained. Additional information on sampling, recruitment, and assessment methods have been described in detail elsewhere (Arria et al., 2008). As we have previously reported results for these traffic-risk behaviors for the baseline (Beck et al., 2008), the present analyses are confined to data collected in Years 2 through 4.

Participant Characteristics

Table 1 describes the sample with respect to sex, race, age, and alcohol consumption variables. Males and females were equally represented (48.5% male), and the sample was predominately White (70.6%). The sample (N=1,253) represented 30.1% of the eligible 2004 incoming class at this university, our target population, and although drug users were oversampled, the sample was similar to the target population with respect to demographics (Arria et al., 2008). By Year 4, the vast majority of the sample were still enrolled in college (94.6%) and had never been married (99.4%). Relative to non-participants, participants had a higher lifetime prevalence of illicit drug use prior to college entry (66.5% vs. 24.4%), including nonmedical use of prescription drugs, and accordingly were more likely to be male and white (Arria et al., 2008). These differences were the expected result of our purposive sampling design, and we accounted for them via the statistical weighting procedures described below (see Data Analysis).

Measures

Annually, participants were asked the following set of questions: "How many times did the following things happen to you during the past 12 months: You were a passenger in a vehicle driven by someone under the influence of alcohol? You drove while drunk on alcohol? You drove after drinking alcohol?" Each question used the following response options: "never," "1-2 times," "3-6 times," "7-9 times," or "10+ times." Response categories were scored 0 to 4, and later dichotomized as "yes" (meaning at least one time in the past year) and "no." Interviewers were trained to explain to participants, if necessary, that driving

after drinking should not include the times they drove drunk. An additional question, “Did you have access to drive a car during the past 12 months?” was also asked.

Thus, each of the three alcohol-related traffic risk behaviors were operationalized for the present analyses as both binary and ordinal (count) variables: 1) Riding with a driver who was under the influence of alcohol (RWID); 2) Driving after drinking any alcohol (DAD); and 3) Driving while intoxicated (DWI). Although the ordinal variables represented ranges rather than integer counts, their distributions resembled a zero-inflated Poisson distribution, as might be expected in a count of behaviors, and were therefore analyzed as Poisson variables as described below. In general, the DWI and DAD analyses were limited to individuals with access to a car; however, individuals who reported DWI or DAD at least once were retained in the analytic sample, even if they denied having had access to drive a car.

Sex was recorded at baseline, as observed by the interviewer. Race was self-reported in Year 3. Age was obtained from the University's data warehouse, per the consent form.

Data Analysis

As noted above, individuals who used an illicit drug at least once prior to college were purposively oversampled; however, because we screened the majority of the population, we were able to statistically correct for our oversampling by computing sampling weights. Sampling weights were computed within each race-sex-drug use cell as the number of students in the sampling frame divided by the number of sampled students, such that oversampled cases (i.e., drug users) represented fewer individuals than undersampled cases (non-users). Thus, prevalence estimates presented in this paper are statistically weighted ($_{wt}$) to reflect the general population of first-year students at the university where our sample was recruited.

Although the sampling design called for a truncated age range (ages 17 to 19 at screening), there was still some variability in age within each assessment. For the present analyses, it was of interest to examine trends by age, rather than by year in college, due to the policy relevance of underage drinking. Therefore, data from Years 2 through 4 were analyzed as repeated measures using generalized estimating equations (GEE) with age as a repeated factor, based on the age of each individual at each assessment. Thus, any individual could have up to three observations represented in the dataset, with a total of six possible ages represented in the data overall (18 through 23). This procedure yielded only a small number of observations for individuals aged 18 (from Year 2) and 23 (from Year 4), which were considered too small for meaningful comparisons and therefore excluded. Thus, the final dataset reflects data from four ages: 19 through 22. Trend comparisons were made of the prevalence and frequency of RWID, DAD, and DWI across the four age groups. GEE analyses were conducted first on the prevalence variables based on the assumption that the criterion variable followed a binomial distribution, and next on the original ordinal variables under the assumption that the criterion variable followed a Poisson distribution. These analyses were regarded as complementary, because, for example, it might be possible for a given behavior to maintain a constant annual prevalence over time, but to occur with increasing frequency among those who engaged in the behavior. Annual prevalence by age and sex was obtained from the estimated marginal means given in the binomial models, using sampling weights as described above. Next, inferential statistics were evaluated in the unweighted dataset to prevent artificially inflating statistical power. Pairwise comparisons of estimated marginal means were evaluated for statistically significant differences, with Bonferroni adjustment, by age and sex. The first-order interaction of age and sex was also entered in the model and retained where statistically significant ($p<.05$).

Results

Figure 1 displays the weighted annual prevalence of the three alcohol-related traffic risk behaviors by sex and age. At age 19, DAD was the most prevalent of the three behaviors for males (48%$_{wt}$), followed by RWID (40%$_{wt}$) and DWI (21%$_{wt}$). For females, however, RWID and DAD were similarly prevalent at age 19 (36%$_{wt}$ and 35%$_{wt}$, respectively), followed by DWI (14%$_{wt}$). The corresponding weighted percentages for males and females together are 38%$_{wt}$, 43%$_{wt}$, and 49%$_{wt}$ for RWID, 42%$_{wt}$, 48%$_{wt}$, and 63%$_{wt}$ for DAD, and 17%$_{wt}$, 20%$_{wt}$, and 25%$_{wt}$ for DWI for ages 19, 20, and 21, respectively (data not shown in a table). Not surprisingly, results of the GEE analyses revealed an overall significant main effect for sex, such that holding age constant, all three behaviors were significantly more prevalent for males than females [$\chi^2(1)=5.2$, $p=.02$ for RWID; $\chi^2(1)=40.2$, $p<.001$ for DAD; and $\chi^2(1)=26.5$, $p<.001$ for DWI; data not shown in a table].

Figure 1 also shows how the proportion of students engaging in each alcohol-related traffic risk behavior increased with age. All three behaviors increased significantly over time for both males and females. With respect to RWID, significant increases occurred at age 20 and again at 21, regardless of sex. With respect to DAD, prevalence increased significantly for males at age 21 only, and at ages 20 and 21 for females. This was particularly concerning given the extremely high prevalence of DAD in males at ages 21 (71%$_{wt}$) and 22 (74%$_{wt}$). Accordingly, the first-order interaction of sex and age was statistically significant for DAD [$\chi^2(3)=8.2$, $p=.04$], indicating that the age-related increase in DAD prevalence was more pronounced in males than females. Finally, DWI prevalence increased significantly at age 21 only, regardless of sex, with prevalence peaking at 29%$_{wt}$ for males and 21%$_{wt}$ for females. The sex-age interaction was non-significant with RWID and DWI.

Table 2 depicts the frequency of RWID at each age by sex. RWID became significantly more frequent at ages 20 and 21, regardless of sex [$\chi^2(3)=51.3$, $p<.001$]. Table 3 presents the results on DAD frequency, by age and sex. Frequency of DAD increased significantly at ages 20 and 21, regardless of sex [$\chi^2(3)=183.4$, $p<.001$]. Table 4 presents the results on DWI frequency, by age and sex. Although none of the consecutive year-to-year comparisons were significantly different, DWI was significantly more frequent at age 21 than at age 19, for both males and females [$\chi^2(3)=9.0$, $p<.03$].

To understand more fully the longitudinal patterns in the three alcohol-related traffic risk behaviors, we conducted an exploratory post-hoc analysis to determine what proportion of students engaged in the behavior in multiple years as opposed to only one year. First, with respect to RWID, 825 individuals reported the behavior in at least one year, of whom 722 provided complete data at all three interviews. Of that subset, 538 (74.5%) reported RWID in two or more years. Next, in the subset of 753 individuals who reported DAD and had complete data, 574 (76.2%) engaged in DAD in two or more years. Finally, within the subset of 379 individuals who reported DWI at least once and had complete data, 221 (58.3%) engaged in DWI in two or more years. Thus, in most cases, RWID, DAD, and DWI were not just isolated events; rather, they usually occurred in multiple years.

To place the present analyses in the broader context of age-related changes in drinking patterns, a post-hoc analysis was conducted on the frequency of drinking and getting drunk. The GEE models above were replicated for two additional dependent variables: number of days drank any alcohol in the past year, and number of days drunk in the past month. Drinking frequency increased significantly every year from age 19 to 22, regardless of sex. By contrast, frequency of drunkenness was stable over time for females but increased significantly for males from age 19 to 21, although no significant annual increases were observed.

Discussion

In this study of college students from one university, drinking and driving—let alone driving while admittedly drunk or intoxicated—was quite common. Nearly half of underage students with access to a car admitted to driving after having anything to drink, despite being under the age of 21 (i.e., $42\%_{wt}$ at age 19; $48\%_{wt}$ at age 20). Although fewer admitted to driving when they were intoxicated ($17\%_{wt}$, $20\%_{wt}$) this is still cause for concern, as younger drivers are more likely to have crashes at low blood alcohol levels (Zador, 1991; Zador et al., 2000) and have a poor ability to judge their levels of impairment or blood alcohol content, especially at higher blood alcohol levels (Hustad and Carey, 2005; Thombs et al., 2003). Thus, the actual crash risk for 19 and 20 year old college students is likely to be much greater than their perceived level of risk.

This study found that once the age of legal purchase is reached, there were noticeable increases across all three measures alcohol-related traffic risk (RWID, DWI and DAD, regardless of sex). This finding was not unexpected, as the rate of alcohol-involved fatal crashes in the U.S. takes a sharp upturn at age 21 (NHTSA, 2000). One in four ($25\%_{wt}$) of the 21-year-old students drove while intoxicated sometime in the past year, $63\%_{wt}$ said that they had driven after drinking any alcohol and $49\%_{wt}$ said that they had ridden with a driver who was intoxicated. Moreover, findings from the post-hoc analysis suggest that the observed increases in alcohol-related traffic risk behaviors parallel concurrent increases in drinking frequency. This finding was not unexpected, and while it might explain some of the observed increases in alcohol-related traffic risk behaviors, the fact that these behaviors increase so substantially remains a serious public health concern, regardless of the underlying reasons.

While this is one of the first studies attempting to document trends in alcohol-related traffic risk among students as they progress through their college experience, several limitations must be mentioned. First, because this study was only administered at one large, public university the results may not be generalizable to students attending other types of institutions, or to non college-attending young adults. Also, because our sampling design deliberately focused on traditional students (first-time, first-year students ages 17 to 19 at college entry), results might not be generalizable to older non-traditional students. Second, although we have no direct evidence that students under-reported or over-reported the behaviors assessed in this study, the potential for self-report bias must be acknowledged. In addition, although we limited most of our analyses to individuals with access to drive a car, we did not attempt to measure how frequently they drove, and therefore we cannot rule out the possibility that some of the observed increase in traffic risk behaviors might be attributable to increased driving frequency overall. The possibility that driving opportunities might increase around the same time as the legal drinking age is concerning and warrants further study. Also, our analytic strategy did not require exclusion of participants with missing data, in order to leverage all available data in this longitudinal study, and therefore some participants were not represented at each age due to attrition. However, response rates have been excellent and no evidence of substantial attrition bias has been observed. Lastly, because drinking and driving behaviors were always assessed for the past 12 months, the correspondence between age and behavior is approximate. For example, depending on a participant's exact age on their assessment day, behaviors assessed at age 21 might have occurred anywhere from age 20 years + 1 day to 21 years + 364 days. However, we have no indication that this uncertainty was distributed unevenly and therefore regard age at assessment as the best approximation of age at behavior.

These findings call into question the assertions of some advocates who claim that lowering the drinking age to 18 would be a useful strategy for reducing harm associated with alcohol

consumption. The present findings are consistent with numerous prior studies showing that increased availability of alcohol is associated with a greater level of problems, especially underage drinking-and-driving fatal crashes (Fell et al., 2009). In short, the observed increase in drinking and driving at age 21 seems to be strongly associated with the age of legal purchase of alcohol. Kypri et al. (2006) found that when the age of legal purchase for alcohol in Australia was lowered from 20 to 18, it was associated with a significant increase in alcohol-involved crashes of young drivers 15 to 19 years of age. Based on these findings, if the drinking age were lowered to 18, it would be reasonable to anticipate seeing a surge in alcohol-related traffic problems coinciding with the new legal purchase age (age 18), when students even have less driving experience. Moreover, we would expect this surge to be preceded by significant levels of alcohol-related traffic risk behaviors and alcohol misuse well before that time. Clearly the levels of harmful drinking documented among high school students (Johnston et al., 2009) indicate that many students are coming to college with their drinking habits, as well as their impaired driving tendencies, already established, and it seems plausible that a lower drinking age could only make alcohol even more available to high school students.

It is important to place the findings in the context of policies related specifically to drinking and driving. This investigation was conducted in a state that has a zero tolerance policy for underage drinkers. Those under 21 who are caught driving with any alcohol in their body (defined as BAC≥0.02) can be arrested and/or fined $500 for the first offense and face a mandatory license suspension for up to one year, with greater penalties for a second offense. Despite such potentially harsh consequences, underage drinking and driving continue to be prevalent well before the age of legal purchase, owing in part to the lack of perceived enforcement of such laws. There are data to indicate that the likelihood of getting caught for an alcohol-related driving offense is perceived to be very low among the general public (Beck et al., 2009). Arguably, college students might even have a lower expectation of enforcement given that most sobriety check points and DWI saturation patrols occur in community settings fairly far from campus roadways.

However, there is reason for concern as well as guarded optimism. Recent evidence indicates that there has been a decline in youth involvement in alcohol-related traffic fatalities (NHTSA, 2001), largely attributable to declines in youthful drinking, minimum legal drinking ages, zero tolerance laws, and programs that seek to motivate youth to refrain from drinking and driving. The effectiveness of minimum legal drinking age laws on preventing youth under 21 from driving while alcohol-impaired was also demonstrated by Fell et al. (2008). However while this suggests that some progress has been made with drivers under 21 years of age, more focus still needs to be directed at drivers age 21 and over —especially those that attend a college or university. One approach that holds promise is the sobriety checkpoint. Sobriety checkpoints have been shown to be effective at reducing the number of alcohol-related crashes as well as single-vehicle nighttime crashes (Fell et al., 2004; Lacey et al., 1999; Levy et al., 1989; Levy et al., 1990) in various communities. The main purpose of a sobriety checkpoint is to deter drinking and driving by elevating the perceived risk of arrest. Highway safety experts have also argued that increased media coverage is necessary to complement this enforcement effort (Elder et al., 2004; Elder et al., 2002; Fell et al., 2003; Mercer, 1985).

Aggressive enforcement coupled with early identification and intervention with individuals at high-risk should be a focus of future efforts to reduce alcohol-related consequences, including lowering alcohol-impaired driving in the general public. Perhaps it is time for increased levels of high visibility enforcement to occur on or around college campuses. College campuses may need to take a more aggressive and proactive approach to impaired

driving, and they need to develop countermeasures that embrace and enforce zero tolerance policies that actively deter alcohol-related traffic risk behaviors.

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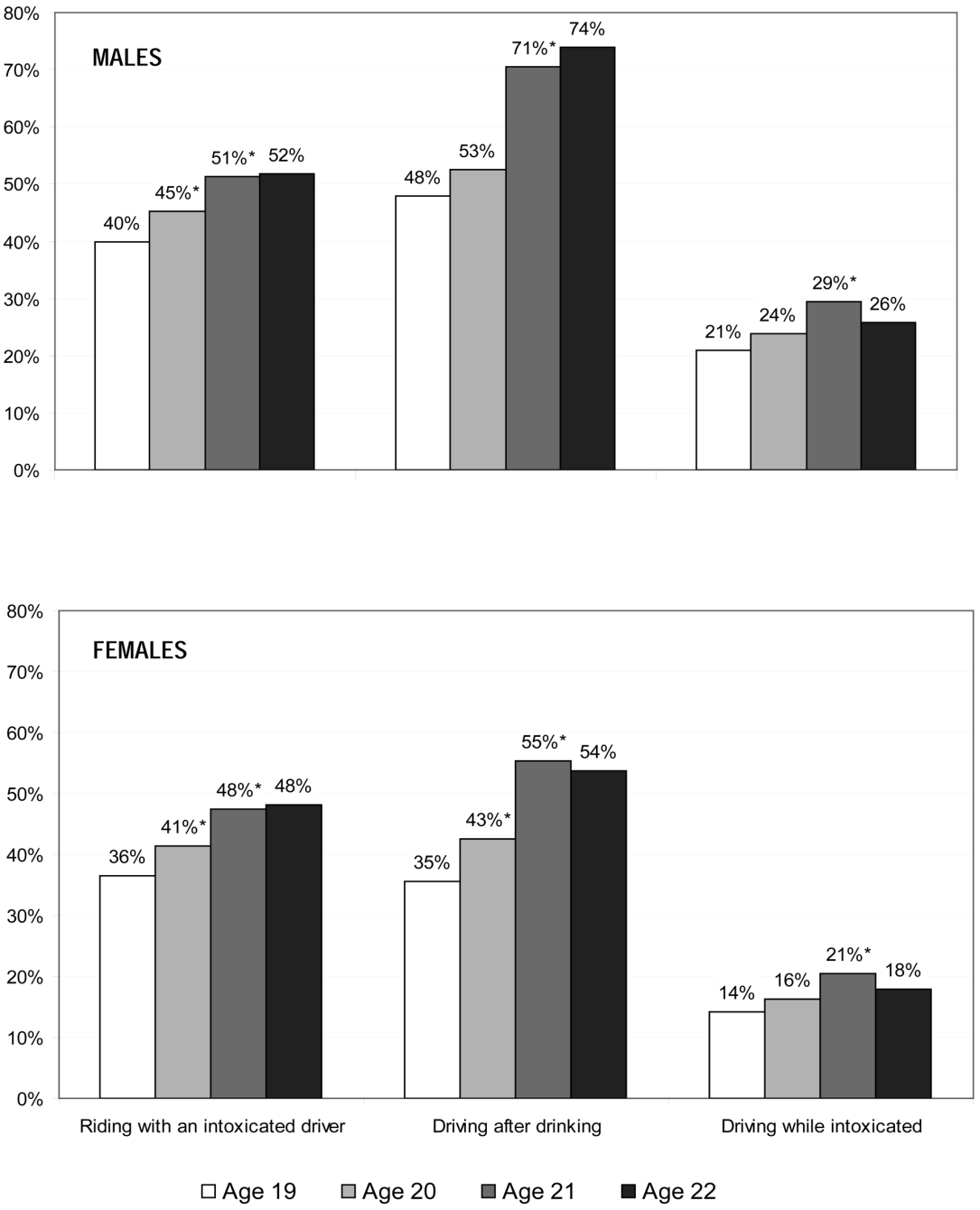

Figure 1. Annual prevalence of riding with an intoxicated driver, driving after drinking, and driving while intoxicated among college students, by age and sex

* Denotes statistically significant change from the preceding year ($p<.05$).

Note: Data on driving after drinking and driving while intoxicated were restricted to individuals who had access to drive a car in the past year.

Table 1

Sample characteristics (*N*=1,253)

	n	%
Sex (*n*, % Male)	608	48.5
Race (*n*, % White)	885	70.6
Age at baseline		
17	54	4.3
18	884	70.6
19	311	24.8
20	4	0.3
Typical number of drinks per drinking day, at baseline[1]		
None (0 drinks/day)	95	7.6
Light (1-2 drinks/day)	215	17.3
Moderate (3-5 drinks/day)	537	43.1
Heavy (6+ drinks/day)	399	32.0

[1] Responses sum to 1,246 due to missing data

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Table 2

Trends in riding with an intoxicated driver (RWID), by age and sex

	Age 19		Age 20		Age 21		Age 22	
	n	**%$_{wt}$**	***n***	**%$_{wt}$**	***n***	**%$_{wt}$**	***n***	**%$_{wt}$**
Females[1]								
Never	258	62.1	304	60.8	260	54.4	67	60.0
1-2 times	139	25.7	152	22.4	135	22.1	32	23.1
3-6 times	45	6.6	79	10.6	90	14.1	18	10.1
7-9 times	13	2.0	15	1.5	26	3.8	5	3.2
10 times or more	27	3.6	38	4.6	40	5.6	6	3.6
Total	482	100.0	588	100.0	551	100.0	128	100.0
Males[1]								
Never	205	62.2	237	55.1	190	48.7	53	48.0
1-2 times	76	18.4	126	22.1	119	20.2	40	25.7
3-6 times	58	11.3	87	12.9	100	18.5	25	14.6
7-9 times	13	2.2	25	3.1	34	4.9	9	5.5
10 times or more	38	5.9	45	6.9	47	7.7	11	6.3
Total	390	100.0	520	100.0	490	100.0	138	100.0
All								
Never	463	62.1	541	58.1	450	51.7	120	53.5
1-2 times	215	22.4	278	22.3	254	21.2	72	24.5
3-6 times	103	8.7	166	11.7	190	16.2	43	12.5
7-9 times	26	2.1	40	2.3	60	4.3	14	4.4
10 times or more	65	4.6	83	5.7	87	6.6	17	5.0
Total	872	100.0	1108	100.0	1041	100.0	266	100.0

Note: Results are presented as unweighted counts and weighted percentages.

[1]For both females and males, statistically significant increases in frequency of RWID occurred at ages 20 and 21 ($p<.05$).

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Table 3

Trends in driving after drinking (DAD), by age and sex

	Age 19		Age 20		Age 21		Age 22	
	n	**%$_{wt}$**	***n***	**%$_{wt}$**	***n***	**%$_{wt}$**	***n***	**%$_{wt}$**
Females[1]								
Never	230	62.9	272	57.6	209	46.0	56	50.7
1-2 times	121	26.4	163	27.7	168	29.4	26	20.9
3-6 times	33	6.1	49	7.5	74	12.6	24	17.7
7-9 times	6	1.1	15	2.1	17	2.6	4	1.9
10 times or more	23	3.5	36	5.1	57	9.4	15	8.8
Total	413	100.0	535	100.0	525	100.0	125	100.0
Males[1]								
Never	149	49.4	189	47.5	108	30.1	29	30.1
1-2 times	100	28.0	144	26.9	138	30.1	41	27.8
3-6 times	51	13.5	75	13.6	109	20.1	35	25.6
7-9 times	14	2.4	25	4.1	35	5.7	6	4.3
10 times or more	37	6.8	54	7.9	84	14.0	24	12.1
Total	351	100.0	487	100.0	474	100.0	135	100.0
All								
Never	379	56.6	461	52.8	317	38.4	85	39.6
1-2 times	221	27.2	307	27.3	306	29.8	67	24.6
3-6 times	84	9.5	124	10.4	183	16.1	59	21.9
7-9 times	20	1.7	40	3.0	52	4.1	10	3.2
10 times or more	60	5.0	90	6.5	141	11.6	39	10.6
Total	764	100.0	1022	100.0	999	100.0	260	100.0

Note: Results are presented as unweighted counts and weighted percentages. Data were restricted to individuals who had access to drive a car in the past year.

[1]For both females and males, statistically significant increases in frequency of DAD occurred at ages 20, and 21 (p<.05).

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Table 4

Trends in driving while intoxicated (DWI), by age and sex

	Age 19		Age 20		Age 21		Age 22	
	n	**%$_{wt}$**	***n***	**%$_{wt}$**	***n***	**%$_{wt}$**	***n***	**%$_{wt}$**
Females[1]								
Never	329	85.7	425	84.0	399	79.4	102	86.3
1-2 times	48	9.8	75	11.8	85	14.7	9	6.5
3-6 times	16	2.7	15	2.0	25	3.5	7	4.3
7-9 times	5	.8	6	.9	7	1.5	3	2.3
10 times or more	7	1.1	11	1.4	7	1.0	1	.5
Total	405	100.0	532	100.0	523	100.0	122	100.0
Males[1]								
Never	243	78.6	335	77.1	298	71.1	93	72.6
1-2 times	47	12.0	77	12.9	101	17.3	24	16.2
3-6 times	28	5.7	44	6.1	39	5.8	14	8.7
7-9 times	7	1.3	12	2.0	11	1.9	3	2.2
10 times or more	13	2.4	14	1.9	19	3.8	1	.4
Total	338	100.0	482	100.0	468	100.0	135	100.0
All								
Never	572	82.5	760	80.7	697	75.4	195	78.9
1-2 times	95	10.8	152	12.3	186	16.0	33	11.7
3-6 times	44	4.1	59	4.0	64	4.6	21	6.7
7-9 times	12	1.0	18	1.4	18	1.7	6	2.2
10 times or more	20	1.7	25	1.7	26	2.3	2	.4
Total	743	100.0	1014	100.0	991	100.0	257	100.0

Note: Results are presented as unweighted counts and weighted percentages. Data were restricted to individuals who had access to drive a car in the past year.

[1]For both females and males, there was a statistically significant increase in frequency of DWI between the ages 19 and 21 ($p<.05$).