Drinking and Driving Among US High School Seniors, 1984–1997

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ABSTRACT

Objectives. This article reports the prevalence of, and trends in, driving after drinking and riding in a car with a driver who has been drinking among American high school seniors, based on data from more than a decade (1984–1997) of annual national surveys.

Methods. Logistic regressions were used to assess the effects of demographic factors (gender, region of country, population density, parental education, and race/ethnicity) and selected "lifestyle" factors (religious commitment, high school grades, truancy, illicit drug use, evenings out per week, and miles driven per week).

Results. Rates of adolescent driving after drinking and riding with a driver who had been drinking declined significantly from the mid-1980s to the early or mid-1990s, but the declines have not continued in recent years. Rates of driving or riding after drinking were higher among high school seniors who are male, White, living in the western and northeastern regions of the United States, and living in rural areas. Truancy, number of evenings out, and illicit drug use all related significantly positively with the dependent variables, whereas grade point average and religious commitment had a negative relationship. Miles driven per week related positively to driving after drinking. (*Am J Public Health.* 1999;89:678–684)

Few issues are more important to the morbidity and mortality of older adolescents and young adults than the combination of drinking and driving. Motor vehicle crashes, many of which are alcohol related, account for a very high percentage of injuries and deaths among young Americans.[1] Therefore, information on the prevalence of, and trends in, driving after drinking and riding in a car with a driver who has been drinking is of considerable importance to the nation's public health agenda. This article uses a unique resource—the Monitoring the Future project—to provide national estimates of America's high school seniors' frequency of driving after drinking and riding with a driver who has been drinking; the information is based on self-report procedures. In addition, we report on the prevalence of such behaviors in various important demographic subgroups. We also examine the associations between driving and drinking and other factors, including religious commitment, high school grades, truancy, illicit drug use, number of evenings out per week, and miles driven in an average week.

Several of these lifestyle factors could influence the mere opportunity to drink and drive. For example, being out many evenings per week could lead to more opportunities for drinking and driving and for being a passenger in a car with a driver who has been drinking. Changes in drinking and driving could potentially be explained by changes in any of the lifestyle factors or by combinations thereof.

Multivariate analyses are used to examine the extent of overlap among the influences associated with the various demographic and lifestyle factors. Several possible explanations of the cross-time changes in drinking and driving are discussed.

Methods

We provide a brief overview of the Monitoring the Future study design, which is described in detail elsewhere.[2,3] Nationally representative samples of about 17 000 12th graders, located in about 135 schools, were selected each year since 1975 through a multistage scientific sampling procedure. Confidential, self-completed questionnaires were administered by professional interviewers during school hours, usually in a regularly scheduled class period. The questions on driving and drinking were added in 1984 and are included in only 1 of 6 forms (distributed in a random sequence within the classroom), so responses to these questions are based on a random one sixth of the total sample of seniors.

The drinking and driving questions were "During the last 2 weeks, how many times (if any) have you driven a car, truck, or motorcycle after drinking alcohol?" and ". . . after having 5 or more drinks in a row?" For riding with a driver who has been drinking, the questions were "During the last 2 weeks, how many times (if any) have you been a passenger in a car when the driver has been drinking?" and ". . . when you think the driver had 5 or more drinks?" Perceived friends' disapproval was assessed by asking "How do you think your close friends feel (or would feel) about you doing each of the following things: driving a car after having 1–2 drinks and driving a car after having 5 or more drinks?"

Respondents were asked about the level of education achieved by each of their parents; responses ranged from grade school or less (coded 1) to graduate work (coded 6). Religious commitment was a mean of 2

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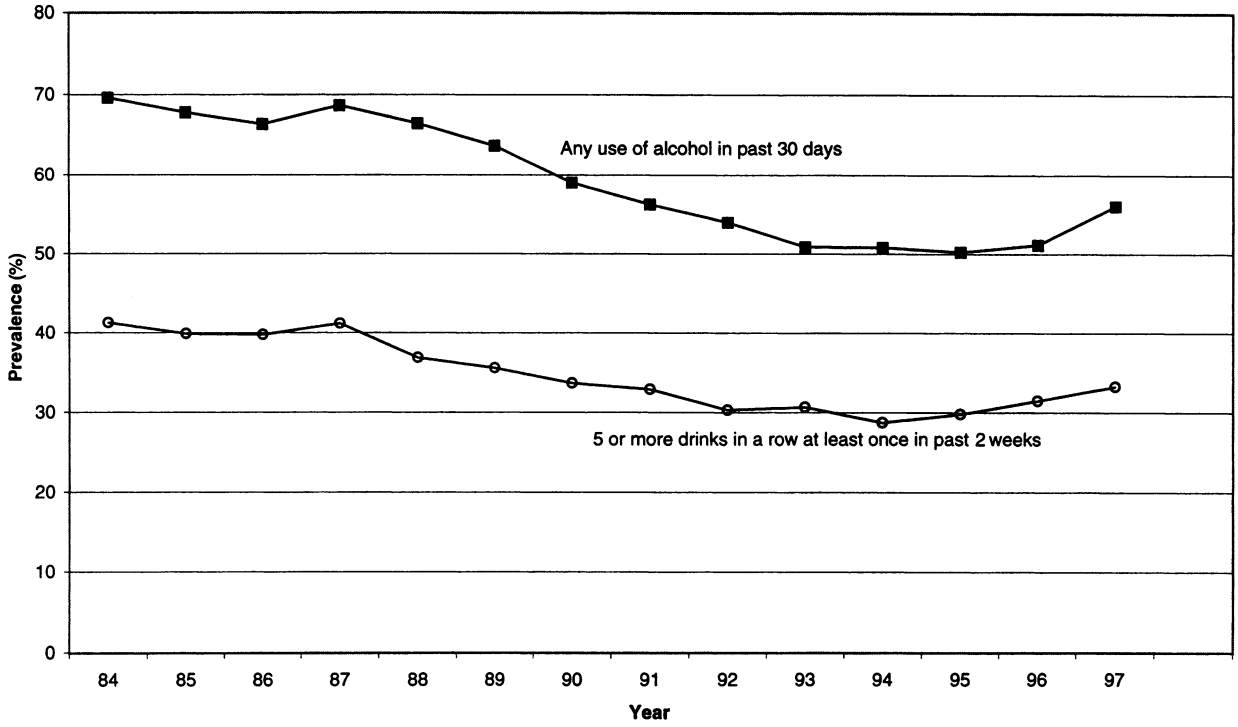


Note. Each data point has a 95% confidence interval of approximately ±2.5%, based on a design effect of 2.0. Based on all 6 questionnaire forms, the estimated increase in 30-day prevalence for 1995 through 1997 is from 51% to 53%, a smaller increase than that shown in the figure, which is based on only 1 of the 6 questionnaire forms. This suggests that the upturn is exaggerated here.

FIGURE 1—Trends in 30-day prevalence of alcohol use and 2-week prevalence of heavy drinking (5 or more drinks in a row) among high school seniors, 1984 through 1997.

items assessing importance of religion in the respondent's life and frequency of attendance at religious services. Grades were assessed by the following question: "Which of the following best describes your average grade so far in high school?" Truancy was a mean of 2 measures, the frequency of skipping either classes or whole days of school during the past 4 weeks. The index of illicit drug use was a measure reflecting any use in the past 12 months of any of 9 classes of illicit drugs; respondents were classified as nonusers, users of marijuana only, or users of an illicit drug other than marijuana. Evenings out per week was assessed by asking "During a typical week, on how many evenings do you go out for fun and recreation?" Miles driven per week was assessed by asking "During an average week, how much do you usually drive a car, truck, or motorcycle?"

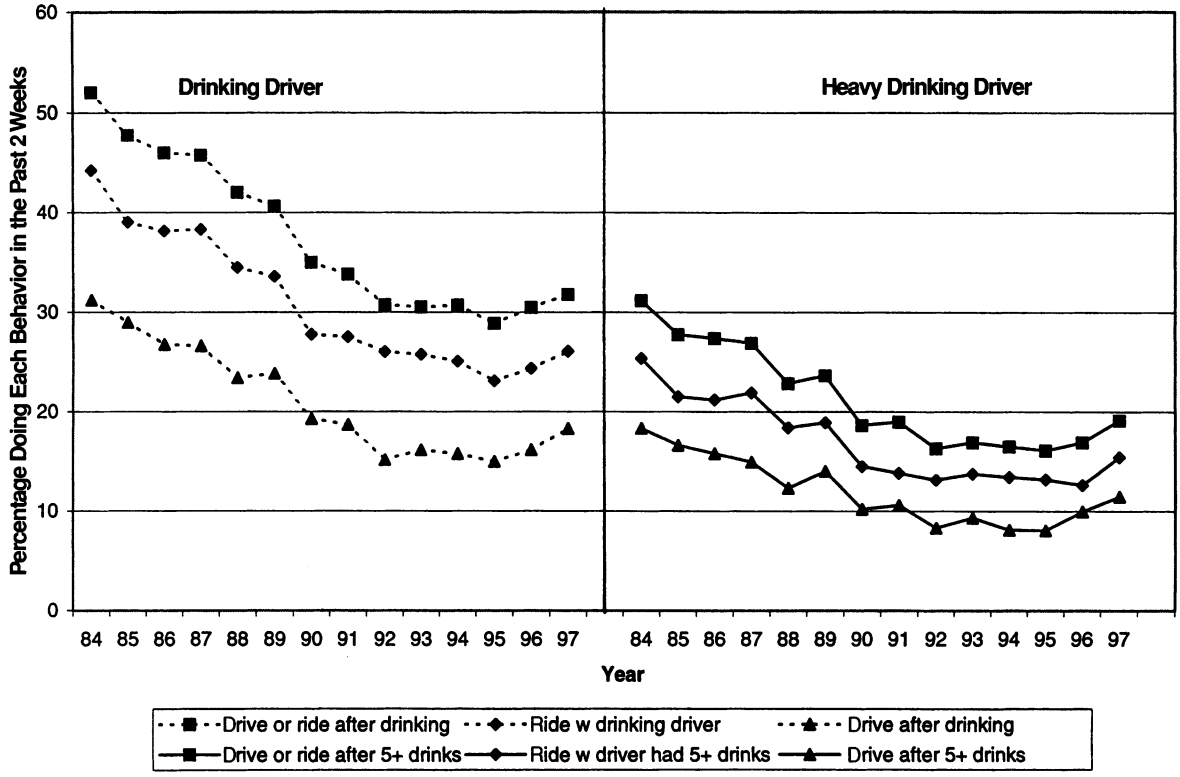
All these measures of lifestyle factors have been used extensively in other publications. More details on their psychometric properties, particularly construct validity, are provided elsewhere.[4] Some of these measures have been repeated in longitudinal follow-up surveys of the Monitoring the Future seniors; based on unpublished analyses of those repeated measures, the estimated reliabilities are as follows: religious commitment, 0.8; index of drug use, 0.8; evenings out per week, 0.6; and miles driven per week, 0.6. Other measures (grades and truancy) were not repeated in the longitudinal surveys; based on previously reported analyses,[5] the reliability of both grades and truancy is estimated at 0.8.

All analyses were conducted with the SAS system.[6] The data were weighted to adjust for differential probabilities of selection of the sample. The weights were normalized to average unity so that the weighted and unweighted numbers of cases are equal. Confidence intervals (CIs) were calculated with a design effect of 2.0.[3]

Results

Although this report focuses on driving after drinking, it is of some relevance to consider just how much drinking is occurring. Figure 1 provides data on the drinking behavior of high school seniors from 1984 to 1997. The higher curve shows the percentage who reported having consumed any alcohol in the 30 days before the survey. The lower curve shows the percentage who reported having had 5 or more drinks in a row on at least 1 occasion in the prior 2 weeks (referred to as "heavy drinking"). The trend lines show that alcohol use was stable in the mid-1980s, then gradually declined through 1994 or 1995, with some increase since then. The percentage reporting any alcohol use in the prior month decreased from 69.6% (95% CI = 67.4, 71.9) in 1984 to 50.3% (95% CI = 47.5, 53.0) in 1995, then rose to 56.1% (95% CI = 53.3, 58.8) in 1997. The measure of heavy drinking declined significantly from 41.3% (95% CI = 38.8, 43.7) in 1984 to 28.7% (95% CI = 26.2, 31.3) in 1994, before rising to 33.2% (95% CI = 30.6, 35.9) in 1997 (the latter change is not statistically significant but clearly is not continuing the earlier downward trend). (Note that these rates differ slightly from those published in annual reports from the study because the present data are based on only 1 of multiple questionnaires used.[3])

Figure 2 shows the trends in driving after drinking, riding with a driver who has been drinking, and 2 combination measures. The left panel in Figure 2 shows trends in the prevalence of driving after any drinking and of riding with a driver who has been drinking. The third variable is a combination measure



Note. Each data point in the left panel has a 95% confidence interval (CI) of approximately ±2.6%, based on a design effect of 2.0. Each data point in the right panel has a 95% CI of approximately ±2.1%, based on a design effect of 2.0.

FIGURE 2—Trends in 2-week prevalence of driving after drinking, riding with a driver who has been drinking, and driving or riding after drinking among high school seniors, 1984 through 1997.

that indicates the percentage of respondents reporting driving after drinking or riding in a car when the driver has been drinking (or both) within the past 2 weeks. The prevalence of driving after drinking declined considerably—from 31.2% (95% CI = 28.8, 33.6) in 1984 to 15.0% (95% CI = 12.9, 17.1) in 1995—followed by a nonsignificant increase to 18.3% (95% CI = 16.0, 20.6) in 1997. The prevalence of being a passenger in a car driven by a person who has been drinking also declined—from 44.2% (95% CI = 41.6, 46.8) in 1984 to 23.1% (95% CI = 20.6, 25.6) in 1995—followed by a nonsignificant increase to 26.1% (95% CI = 23.5, 28.7) in 1997.

Total exposure to drinking and driving shows a trend pattern similar to its 2 components but at a higher level; the level is considerably less than the sum of the 2, indicating a high degree of overlap in these 2 behaviors. In sum, more than half of all 1984 high school seniors had been in a motor vehicle in which the driver had been drinking. Although the percentage riding with drivers who had been drinking declined considerably, in 1997 about one third of the seniors still exposed themselves to that situation.

The right panel of Figure 2 shows the corresponding data for driving after heavy drinking and riding with an impaired driver (i.e., someone who was thought to have had 5 or more drinks in a row). The 2-week prevalence of driving after having had 5 or more drinks declined from 18.3% (95% CI = 16.3, 20.4) in 1984 to 8.1% (95% CI = 6.4, 9.7) in 1995 and then increased to 11.5% (95% CI = 9.6, 13.4) in 1997. The 2-week prevalence of being a passenger in a vehicle with an impaired driver decreased from 25.4% (95% CI = 23.1, 27.7) to 13.2% (95% CI = 11.2, 15.2) between 1984 and 1995 and then increased to 15.4% (95% CI = 13.3, 17.6) in 1997. Nearly one third of all seniors (31.2%; 95% CI = 28.7, 33.6) in 1984 reported any exposure to an impaired driver—shown in the top line in the right panel of Figure 2. By 1995, this figure had declined to 16.1% (95% CI = 13.9, 18.3) but increased to 19.1% (95% CI = 16.8, 21.5) in 1997. All of the changes between 1984 and 1995 were statistically significant, but the changes between 1995 and 1997 were generally not statistically significant.

Table 1 shows the prevalence of the various drinking- and driving-related behaviors for selected demographic characteristics (gender, region of country, population density, parental education, and race/ethnicity) and lifestyle variables (religious commitment, high school grades, truancy, illicit drug use, number of evenings out per week, and miles driven per week). The data have been aggregated across the 4 most recent years—1994 to 1997—to average out sampling fluctuations from year to year. Table 1 also shows the current prevalence of drinking behavior by subgroups, for comparison purposes.

Table 2 provides odds ratios from bivariate (one predictor at a time) and multivariate (all predictors included) logistic regressions. Demographic and lifestyle factors were used to predict the 4 measures of driving after drinking or riding with a driver who has been drinking. Gender showed a significant difference for all measures except riding in a car with a driver who has been drinking. Male seniors had higher rates than female seniors.

The West and Northeast had significantly lower rates of driving after drinking, compared with the South. This pattern differs from the pattern for drinking, for which only

TABLE 1—Prevalence of Drinking Alcohol and Driving or Riding After Drinking by Subgroups of American High School Seniors: 1994 Through 1997 Combined

		Drinking		Driving After		Riding After	
	n[a]	30 Days	Heavy	Drinking	Heavy Drinking	Drinking	Heavy Drinking
Total	8520	52.1	30.8	16.3	9.4	24.7	13.7
Gender							
Male[b]	3854	56.4	38.1	20.9	13.5	25.3	16.0
Female	4412	48.1*	24.0*	12.0*	5.8*	24.3	11.8*
Region							
Northeast	1461	57.1*	32.9	12.5*	6.1*	23.5	11.0*
North Central	2383	52.9	33.5*	18.6	11.1	24.8	14.8
West	1637	46.1*	25.8*	12.6*	7.5*	22.5*	12.6
South[b]	3039	51.9	30.2	18.3	10.7	26.3	14.7
Population density							
Large MSA	2250	51.6	29.8	14.1*	8.2*	22.7*	12.5*
Other MSA	3917	52.4	30.4	15.6*	8.7*	24.5	13.0*
Non-MSA[b]	2353	52.2	32.5	19.5	11.6	26.8	16.0
Parental education							
1.0–2.0 (low)[b]	664	45.8	24.9	15.5	8.9	26.2	15.4
2.5–3.0	1998	51.9*	31.0*	16.9	9.8	25.9	15.5
3.5–4.0	2429	51.3*	31.4*	15.3	8.6	25.7	13.8
4.5–5.0	2071	54.3*	31.4*	16.3	9.2	22.8	12.1
5.5–6.0 (high)	1180	55.8*	32.8*	17.9	10.8	22.1	11.3
Race/ethnicity							
White[b]	6083	55.7	34.5	17.8	10.1	24.5	13.5
Black	872	37.3*	15.9*	10.4*	5.9*	23.4	11.8
Hispanic	703	51.4	28.5*	14.7	9.1	30.6*	18.3*
Religious commitment							
1.0–2.0 (low)[b]	2796	60.4	39.3	20.4	12.3	28.6	15.8
2.5–3.0 (medium)	2522	57.4	34.3*	18.0	11.1	28.6	17.4
3.5–4.0 (high)	2929	39.3*	19.8*	11.0*	5.3*	17.4*	8.5*
Grades							
A[b]	2613	43.3	23.6	12.8	6.5	19.4	9.2
B, B+	3118	52.8*	30.5*	15.1	8.4*	24.2*	12.9*
B– or lower	2705	59.1*	37.4*	20.9*	13.1*	29.8*	18.3*
Truancy							
None[b]	4241	39.7	20.7	10.0	4.8	16.2	8.2
0.5 (low)	1332	58.4*	34.2*	16.7*	9.0*	29.0*	13.9*
1.0–1.5 (medium)	1485	66.3*	41.8*	23.1*	13.5*	33.8*	19.1*
2.0–5.5 (high)	1111	73.5*	53.1*	32.4*	23.2*	40.5*	28.0*
Illicit drug use, 12 months							
None[b]	5169	34.5	15.5	7.5	3.6	14.9	6.9
Marijuana only	1584	77.6*	49.1*	25.2*	14.8*	36.2*	19.4*
Other than marijuana	1634	80.7*	60.3*	34.9*	22.0*	43.9*	28.8*
Evenings out/week							
0 or 1[b]	1949	31.2	13.7	6.5	3.8	14.2	7.8
2	2380	49.1*	26.0*	13.2*	7.1*	20.2*	9.8
3	2091	57.5*	33.6*	18.4*	11.2*	27.4*	14.7*
4+	2016	69.9*	49.8*	27.3*	15.5*	36.8*	22.6*
Miles driven/week							
0[b]	1159	39.4	19.7	3.5	2.5	22.6	10.9
1–50	2811	46.0*	24.3*	11.1*	5.9*	22.2	12.1
51–100	1811	56.1*	35.6*	20.0*	11.3*	26.5	14.1
100+	2653	61.8*	39.9*	24.9*	14.7*	26.7*	16.1*

Note. MSA = metropolitan statistical area.
[a]Entries in this column are approximate weighted numbers of cases.
[b]This is the excluded category in logistic regression; one variable at a time is used as a single predictor variable.
*Significantly different from excluded category, $P < .01$.

the West is significantly lower. (The Northeast had significantly higher rates of any drinking in the past 30 days, whereas the North Central region had significantly higher rates of heavy drinking.)

Rates of driving after drinking, or riding with a driver who has been drinking, are negatively associated with population density. This pattern differs somewhat from that for drinking (no significant differences).

Parental education had no significant association with driving after drinking or with riding with a driver who has been drinking. Again, the pattern is different from that for drinking (significant positive association).

With respect to racial/ethnic groups, Hispanic seniors had significantly higher rates of riding with a driver who has been drinking, although their rates of driving after drinking were not significantly different from those of White seniors. Hispanic rates of heavy drinking were significantly lower than those of White seniors. African American

TABLE 2—Bivariate and Multivariate Odds Ratios, Predicting to 4 Drinking and Driving Behaviors: 1994 Through 1997 Combined

	Driving After				Riding in a Car After Driver Had			
	1+ Drinks		5+ Drinks		1+ Drinks		5+ Drinks	
	Bivariate	Multivariate	Bivariate	Multivariate	Bivariate	Multivariate	Bivariate	Multivariate
Gender								
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.52*	0.61*	0.39*	0.45*	0.95	1.17	0.70*	0.87
Region								
Northeast	0.64*	0.55*	0.54*	0.42*	0.86	0.67*	0.72*	0.56*
North Central	1.02	1.00	1.04	1.01	0.93	0.90	1.01	1.00
West	0.65*	0.59*	0.68*	0.58*	0.82*	0.67*	0.83	0.65*
South	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Population density								
Large MSA	0.68*	0.55*	0.69*	0.51*	0.80*	0.58*	0.75*	0.59*
Other MSA	0.77*	0.62*	0.73*	0.58*	0.88	0.68*	0.78*	0.63*
Non-MSA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parental education								
1.0–2.0 (low)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2.5–3.0	1.11	0.94	1.11	0.88	0.99	0.83	1.01	0.94
3.5–4.0	0.99	0.87	0.96	0.80	0.98	0.88	0.88	0.87
4.5–5.0	1.07	0.89	1.04	0.87	0.83	0.78	0.75	0.74
5.5–6.0 (high)	1.19	1.14	1.25	1.15	0.80	0.85	0.70	0.78
Race/ethnicity								
White	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black	0.54*	0.82	0.56*	0.84	0.94	1.09	0.85	0.97
Hispanic	0.80	1.25	0.89	1.59	1.36*	1.63*	1.43*	1.67*
Religious commitment								
1.0–2.0 (low)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2.5–3.0 (medium)	0.86	0.97	0.89	0.99	1.00	1.04	1.13	1.22
3.5–4.0 (high)	0.48*	0.75*	0.40*	0.63*	0.53*	0.68*	0.50*	0.72*
Grades								
A	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
B, B+	1.21	0.97	1.32*	1.10	1.32*	1.07	1.46*	1.14
B– or lower	1.80*	1.15	2.15*	1.26	1.76*	1.12	2.22*	1.27
Truancy								
None	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.5 (low)	1.82*	1.44*	1.94*	1.49*	2.12*	1.84*	1.81*	1.46*
1.0–1.5 (medium)	2.72*	1.87*	3.07*	2.05*	2.65*	1.98*	2.65*	1.96*
2.0–5.5 (high)	4.34*	2.46*	5.95*	3.26*	3.54*	2.16*	4.36*	2.46*
Illicit drug use, 12 months								
None	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Marijuana only	4.16*	3.03*	4.70*	3.14*	3.23*	2.38*	3.23*	2.42*
Other than marijuana	6.62*	4.64*	7.61*	4.78*	4.47*	3.09*	5.41*	3.55*
Evenings out/week								
0 or 1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.20*	1.68*	1.91*	1.50	1.53*	1.39*	1.28	1.07
3	3.28*	2.28*	3.15*	2.15*	2.28*	2.16*	2.04*	1.59*
4+	5.43*	2.65*	4.59*	2.09*	3.52*	2.61*	3.44*	2.19*
Miles driven/week								
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1–50	3.39*	5.17*	2.41*	2.93*	0.98	0.97	1.12	1.02
51–100	6.82*	8.41*	4.95*	5.58*	1.23	1.03	1.34	1.08
100+	9.00*	9.11*	6.70*	6.01*	1.24*	0.88	1.57*	0.96

Note. MSA = metropolitan statistical area.
*$P < .01$.

seniors had significantly lower rates of driving after drinking, although their rates of riding with a driver who has been drinking were not significantly lower than those of White seniors. African American rates of drinking were also significantly lower than those of White seniors.

Religious commitment showed a nonlinear association with the dependent variables. Those with the highest religious commitment had the lowest rate of both drinking and impaired driving, whereas those in the lowest and the middle categories had fairly similar rates to one another in the drinking and driving behaviors.

As can be seen in Tables 1 and 2, the lifestyle factors examined here relate strongly to drinking and driving behaviors. Truancy, illicit drug use, and number of evenings out per week all had a significant positive relationship to the several dependent variables, whereas grade point average had a negative relationship.

Miles driven per week related positively and strongly to driving after drinking. With respect to riding with a driver who has been drinking, the association is weaker;

only respondents who reported driving more than 100 miles per week had significantly elevated rates.

The multivariate results in Table 2 show that there is relatively little redundancy among the demographic and lifestyle variables. In most cases, those variables that are statistically significant in the bivariate context remain significant in the multivariate context. The odds ratios generally become closer to 1 because there is some degree of overlap in predictive power. One exception to the general result is the effect of race/ethnicity: African American seniors have odds ratios significantly different from those of White seniors in driving after drinking, in the absence of other factors. When all other factors are included, however, the relationship becomes nonsignificant.

Analyses not shown here indicate that the factors that render the odds ratios nonsignificant are religious commitment and miles driven per week: African American seniors drive less (which helps account for their lower rates of driving after drinking) and are more committed religiously (which also helps account for their lower rates of driving after drinking). High school grades are also an exception to the general rule. Seniors with lower grades tend to be significantly more likely to drive after drinking and to ride with a driver who has been drinking; however, these associations become nonsignificant in the presence of other factors. (Many of the other lifestyle factors are strongly associated with grades, including truancy, illicit drug use, and evenings out per week. We recognize that illicit drug use and alcohol use are both conceptually and empirically highly correlated; therefore, controlling for illicit drug use may be, in some sense, "overcontrolling" in examining the relationships between the other variables and drinking and driving. Nevertheless, we consider illicit drug use an indicator of a deviant lifestyle, and it is therefore useful to examine the association between illicit drug use and drinking and driving.) Finally, seniors who drive a lot (100 miles per week or more) are significantly more likely to ride with a driver who has been drinking, but that association becomes nonsignificant when other factors are included.

Additional logistic regressions were run on earlier years in two 5-year groupings: 1984 through 1988 and 1989 through 1993. The results (not shown) were essentially similar except that the multivariate odds ratios for African American seniors were statistically significant in the 2 earlier 5-year blocks. Examination of the data showed that rates of driving after drinking declined distinctly more among White seniors in the interval from 1984 to 1997 than among African Americans, which substantially reduced the difference between them. Thus, in the earliest time interval (1984 through 1988), African American seniors were found to be significantly less likely than White seniors to drive or ride after drinking, even with control for other demographic and lifestyle factors. Although African American seniors continued to drive and ride after drinking less frequently than did White seniors, the difference with control for other factors was sufficiently small as to be nonsignificant. (Interaction between year-group [1984 through 1988, 1989 through 1993, 1994 through 1997] and African American group membership was tested by a logistic regression that used all years of data; the interaction was statistically significant [$P < .01$] for driving or riding after drinking, with 1994 through 1997 differing from 1984 through 1988.)

Limitations

Two limitations to the generalizability of the results should be noted. First, individuals who dropped out of school were not included. However, the exclusion of dropouts probably leads to only slight underestimates of various behaviors for the entire age cohort, because dropouts are a relatively small proportion (approximately 15%–20% nationally) of the age cohort.[3] (Still, dropouts may well contain a disproportionate share of impaired drivers.) Second, those seniors who were absent on the day of the survey were also excluded. The exclusion of dropouts and absentees means that the estimates of driving and drinking behaviors presented here are likely to be underestimates. However, because the biases are probably essentially constant over time, the trends are likely not biased.[3] Another possible limitation is that the study relies on self-reports. Various studies have shown, however, that under the proper conditions (such as those used in the present study), youthful reports of alcohol and other substance use are generally reliable and valid.[7–11]

Discussion

Three findings were noteworthy: (1) a very large number of students have exposed themselves to alcohol-impaired driving, even at the low points; (2) a substantial improvement occurred between 1984 and 1995, most of which had occurred by 1992; and (3) no further improvement (and perhaps some relapse) occurred between 1995 and 1997.

Multivariate analyses incorporating demographic and lifestyle factors showed the following results. With respect to demographic factors, (1) male high school seniors were significantly more likely than female seniors to report driving after drinking but not to report riding with a driver who had been drinking; (2) seniors in the Northeast and West were less likely than seniors in the South and the North Central region to report alcohol-related driving or riding; (3) seniors in more rural areas reported more alcohol-involved driving or riding than did seniors in metropolitan statistical areas; (4) no significant differences were associated with parental education, a proxy for socioeconomic status; and (5) Hispanic seniors reported more riding with a driver who had been drinking, compared with White and African American seniors. With respect to lifestyle factors, (1) high school grades were not significantly associated with alcohol-related driving or riding; (2) seniors who had high levels of religious commitment reported less alcohol-associated driving or riding than did seniors who had lower levels of religious commitment; (3) truancy, use of illicit drugs, and evenings out per week all were significantly and positively related to driving after drinking and to riding with a driver who had been drinking; and (4) the number of miles driven in an average week was positively associated with driving after drinking but not with riding with a driver who had been drinking.

One of the most important conclusions of this study is that this class of adolescent risk behavior—drinking and driving—can be changed over time, as illustrated by the substantial declines in drinking and driving that occurred between 1984 and 1992. Changes in the amount of drinking account for some of the changes in drinking and driving, but the drinking-and-driving rates have decreased considerably more than drinking has. The prevalence of heavy drinking declined by about 21% between 1984 and 1997 (prevalence decreased from 39% to 31%), whereas driving after drinking and after heavy drinking both declined by about 40% over the same interval (prevalence decreased from 31% to 18% and from 18% to 11%, respectively). Furthermore, the trends in driving after drinking and after heavy drinking among only seniors who report current drinking are essentially parallel to the trends for all seniors. Another potentially important explanatory factor is the amount of driving that seniors do, but this cannot account for the declines in drinking and driving because driving has actually increased.

Perceived risk of harm from use and disapproval of use have been important factors in explaining trends in illegal drug use.[3,12–14] Measures of the perceived risk of harm from drinking and driving, or of seniors' own disapproval of drinking and driving, were not included in this study. However, measures of

seniors' perceptions of the extent to which their friends would disapprove of their driving after drinking were available. In 1997, about half (48%; 95% CI = 45.0, 51.0) of seniors reported that their friends would strongly disapprove of their driving after having 1 to 2 drinks; in 1984, only 30% (95% CI = 27.4, 32.4) of seniors reported that level of disapproval. Between 1984 and 1997, changes in friends' disapproval of driving after drinking and in seniors' driving after drinking corresponded closely. As disapproval increased (or decreased), drinking and driving decreased (or increased). Although the close connection does not conclusively demonstrate a causal relationship, it does suggest that the substantial decline in drinking and driving observed between 1984 and 1997 may have occurred largely because of a substantial change in the social acceptability of such behavior among young people themselves.

Other factors may have contributed to reducing driving after drinking and drinking per se. Various legal and social activities have been directed at reducing drinking and driving among adults and adolescents.[15] Increases in the minimum drinking age, which occurred between 1984 and 1987 in several states, were followed by lowered rates of drinking among students, higher perceived risk, and more disapproval of drinking in those states.[16] This particular policy change likely was responsible for some, but certainly not all, of the decline in drinking and driving, because changes occurred in states that did not alter their minimum drinking age.[16] Other policy initiatives aimed at youth, including "zero tolerance" laws (lower legal blood alcohol concentration limits for underage drinkers), may have played some role in the downturn.[17]

National campaigns aimed at discouraging drunk driving by organizations such as Mothers Against Drunk Driving and the Ad Council also may have had an effect. Certainly, the hardening of peer norms against drunk driving would be consistent with such an interpretation.

The rate of alcohol-related traffic fatalities declined substantially between 1984 and 1992; the rate of decline slowed noticeably after 1992.[18] These trends correspond closely with the observed declines in self-reported drinking and driving by high school seniors. Both indicators accord with broader societal events, including the substantial national attention given to the Mothers Against Drunk Driving efforts (which peaked around 1984), the increases in minimum drinking ages (which occurred primarily between 1984 and 1987), and the national campaign for "designated drivers" (which occurred primarily between 1989 and 1992).[19] Societal attention to, and media coverage of, drinking and driving has abated since then, and we may be seeing the results of that abatement.

The recent leveling and, perhaps, upturn in rates of driving after drinking by students provide cause for concern. A process of "generational forgetting" of the dangers of drugs may be responsible for the upturn in illicit drug use observed in the early 1990s; that is, the more recent cohorts of teenagers have heard and seen considerably less of the dangers of drugs than earlier cohorts heard and saw. A similar process may be occurring with respect to the dangers of driving after drinking. If so, new prevention efforts may be necessary, including policy initiatives and systematic media campaigns, to avert a relapse in driving after drinking among newer cohorts of teenagers. □

Contributors

Both authors contributed to conceiving and designing the study, analyzing and interpreting the data, and writing the paper. Both authors approved the final version of the paper and take responsibility for its content.

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