



Do the designated drivers of college students stay sober?

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Abstract

Problem: By numerous accounts, alcohol abuse is considered the number one drug problem facing young people today. Alcohol consumption and its negative consequences, especially those due to drinking and driving, continue to have devastating effects on the college student population. **Method:** This field study examined the blood alcohol concentration (BAC) levels of male and female designated drivers (DD), non-DD, and their respective passengers as they were leaving drinking establishments in a university town. Also investigated were the effects of group size and gender on DD use. **Results:** A 2 Gender \times 2 Driver type (DD vs. non-DD) analysis of variance (ANOVA) for BAC indicated significant main effects for Gender and Driver type, with higher BAC for men and non-DD (p 's $< .001$). A significant Gender \times Driver type interaction ($p < .05$) was primarily due to female DD having lower BAC than male DD. In addition, larger groups were more likely to have a DD. **Impact on Industry:** Results indicate that the success of DD programs may be influenced by group size and a DD's gender. While larger groups are more likely to have a DD, students riding home with a male DD may still be at risk for the negative consequences of drunk driving.

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1. Introduction

One of the most important problems facing America today is alcohol abuse and its side effects, from physical disease to driving while intoxicated. A population at special risk for problems with alcohol use and misuse is college students. Reports show that 42.7% of college students become intoxicated with alcohol and 20.7% become intoxicated frequently (Wechsler, Lee, Kuo, & Lee, 2000). Excessive alcohol consumption can lead to a wide range of negative consequences, such as physical violence, property damage, poor academic or work performance, and vehicle crashes (Lewis, Malow, & Ireland, 1997; Meilman, 1993; Presley, Meilman, & Lyerla, 1993; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998).

Driving under the influence (DUI), and associated vehicle crashes, is a particularly salient alcohol-related problem. Although some research suggests that the incidence of alcohol-impaired driving has decreased from ear-

lier years (Lund & Wolfe, 1991), highway statistics say otherwise. In 2000, 33% of all traffic fatalities occurred in crashes in which at least one driver or a pedestrian had a blood alcohol concentration (BAC) of 0.10 or higher (National Highway Traffic Safety Administration (NHTSA), 2000). College students may be most at risk for these fatalities. In fact, more than 40% of fatalities among 16- to 20-year-olds result from motor-vehicle crashes, with about half of these deaths related to drinking and driving (NHTSA, 2000).

Despite intolerance posited by government officials and state legislatures (National Commission Against Drunk Driving, 1985), individual communities throughout the United States continue to suffer from the negative effects of drinking and driving. In response, the government and state legislatures have been supported by local community-wide interventions to curtail injuries and deaths caused by alcohol-impaired driving. The present study examined issues related to a popular community-based approach to reducing DUI—the promotion of using a designated driver (DD). A DD is generally defined as a person who agrees to abstain from drinking alcohol and drives for one or more other persons who have consumed alcohol (Barr & MacKinnon, 1998). This approach has been considered by

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some to be among the most promising for reducing problems from drinking and driving in college communities (Eigen, 1991).

According to the Harvard Alcohol Project (Winsten, 1994), the benefits of using DD are that they promote the social norm of abstinence from alcohol consumption, legitimize the nondrinking role in a social group, offer a specific and practical way to avoid DUI, and encourage proactive behavior with regard to self-monitoring alcohol intake. Proponents of community-wide DD campaigns contend the DD approach is a simple and straightforward concept that can be easily integrated into mass communication messages as a way to reduce DUI and ultimately change social norms (Glascoff, Knight, & Jenkins, 1994). Other advantages of the DD approach include the low cost of implementing this strategy on a large scale and the focus on group involvement in choosing a DD. Such social decision-making helps to bolster a norm against DUI (Eigen, 1991). The current research studied a critical question regarding the potential effectiveness of a DD program. Do DDs remain sober?

While the DD intervention seems simple and straightforward, it has led to a heated debate among public health officials and traffic safety experts regarding possible negative aspects of the DD approach. Some critics have speculated that DD programs may actually do more harm than good because they give individuals with a DD an excuse to consume more alcohol (Aspler, Harding, & Goldfein, 1987; Dejong & Wallack, 1992; Stewart, 1992). Indeed, many DD programs avoid presenting the negative implications of drinking, except with regard to DUI, and imply it is “okay” to drink as much as you want as long as you do not drink and drive (Glascoff et al., 1994).

If the DD concept encourages or gives tacit approval to excessive drinking by the DD’s companions (Mosher, 1991), the promotion of DD in a college community may be especially problematic. This is because of the extremely high level of alcohol consumption among college students, including binge drinking with intentions to reach high levels of intoxication (Glindemann, Geller, Clarke, Chevaillier, & Pettinger, 1998; Glindemann, Geller, & Ludwig, 1996; Wechsler, Dowdall, Davenport, Moeykens, & Castillo, 1994). The present study investigated whether students with a DD were more intoxicated than those without.

A large-scale survey examined self-report data from a national sample of students ($n = 17,592$) attending 140 four-year colleges (Dejong & Winsten, 1999). Results indicated that among students who drink alcoholic beverages, those more likely to serve as a DD are female, white, over 21 years of age, and members of Greek-life organizations. Of their sample, 12% of the drinkers who had served as a DD in the past 30 days reported driving after consuming five or more drinks and 4% had done so two or more times. Twenty-five percent also reported having been a vehicle passenger with an impaired driver in the past 30 days.

The survey by Dejong and Winsten (1999) found that of the students reporting to have consumed alcohol in the past year and who served as a DD in the past 30 days, 53% indicated they did not consume any alcohol the last time they served as a DD. An additional 26% said they consumed one drink and 19% reported having consumed more than one drink when performing the role of DD.

This latter finding is troublesome given that a driver with a BAC of 0.05 is about twice as likely to be involved in a fatal traffic crash due to impaired psychomotor performance than is an individual who has consumed no alcohol whatsoever (Sleet, Wagenaar, & Waller, 1989). In the same vein as the Dejong and Winston study, a telephone survey of 937 adults found that when asked to define what a DD is, participants did not always report that a DD is someone who abstains from drinking alcohol (Lange, Voas, & O’Rourke, 1998). In fact, 11% of people surveyed reported that a DD could be someone who had consumed two or more beverages before driving.

The current research went beyond self-report data and compared the actual intoxication levels of DD and their passengers. In the context of college drinking, it may be difficult for a DD to abstain from alcohol consumption. Glascoff et al. (1994) found that only 33% of college students who reportedly served as DD admitted to complete abstinence. More than 60% of the respondents ($n = 288$) agreed that DD should not drink any alcohol, while 37% indicated that the DD could still have one or two drinks and be capable of driving everyone home. Similarly, a study that investigated the actual alcohol intoxication of DDs on the roadside found that a significant number of DDs had a positive BAC (Fell, Voas, & Lange, 1997). Such findings suggest that some DDs for college students might not be sober. The present research systematically explored this possibility.

Two possible moderators of DD effectiveness were also studied, namely the size of a DD’s group and the gender of the DD. Because the purpose of a DD is to help others in a social group, it is likely that the size of a group will influence whether a DD is used and whether a DD remains sober. Survey research has shown that greater sobriety among group members increases the likelihood that one of those group members will try to stop another member from driving drunk (Newcomb, Rabow, Hernandez, & Monto, 1997). Thus, it is reasonable to expect larger groups to exert more group pressure to select a DD and make sure the DD remains sober.

Several studies have shown gender to be a moderator of alcohol consumption, especially among college students. More specifically, male college students typically consume more alcohol than coeds and reach higher levels of intoxication (Geller, Altomari, Russ, & Harwood, 1985; Geller, Clarke, & Kalsher, 1991; Geller & Lehman, 1988; Presley et al., 1993). These gender differences may be reflected in who chooses to serve as a DD and whether the DD remains sober.

Survey research investigating motivational factors in male college students found that many men report high perceived behavioral control with regard to driving while intoxicated (Marcil, Bergeron, & Audet, 2001). That is, they feel they have control over their driving even under the influence of alcohol. Combining this finding with evidence that men often drink to higher levels of intoxication and women are more likely than men to serve as DD (Dejong & Winsten, 1999), it is reasonable to expect more frequent and effective DD service from women than men. The present research studied this possibility systematically by assessing the BAC of male and female university students leaving downtown drinking establishments. Through both direct observation and self-report, researchers assessed the size of drinking groups and whether the groups had a DD. It was hypothesized that: (a) DD would have lower BAC than non-DD, (b) female DD would have lower BAC than male DD, (c) participants with a DD would have higher BAC than participants without a DD, and (d) the probability of a group having a DD would vary directly with the size of the group.

2. Methodology

2.1. Participants and setting

Participants were leaving local bars and nightclubs in the downtown area of Blacksburg, VA. Including the 25,000 students of a large southeastern university, the town has a population of approximately 40,000. A total of 807 groups, consisting of two or more individuals, were approached and queried about their use of a DD. Of those groups approached, 480 groups agreed to participate in the study, meaning they agreed to answer a few questions about the group's DD plan and at least one group member agreed to a BAC assessment. However, those who walked or used public transportation were excluded from the data. As a result, a total of 457 individual men and women were considered participants.

Participants ranged in age from 17 to 41 years old, with 91% of the participants ($n=418$) in the 18- to 25-year-old range. The sample consisted of 418 (91%) college students and 39 (9%) nonstudents. The field observations were recorded on Wednesday and Thursday evenings over 7 consecutive weeks.

2.2. Apparatus

Participants' BAC levels were assessed using hand-held Alco-Sensor III and IV breathalyzers (Intoximeters, St. Louis, MO). Before submitting a breath sample, participants rinsed their mouths with 2 oz of water to remove any residual alcohol. A standardized sampling procedure was used to ensure alveolar (i.e., deep lung) air was collected.

All instruments were calibrated by the local police department immediately before the study.

2.3. Participant recruitment

Teams of two trained undergraduate research assistants were stationed in three public areas in downtown Blacksburg, VA on Wednesday and Thursday evenings from 9 p.m. to 2 a.m. As groups of two or more students exited drinking establishments, pairs of research assistants randomly approached them. One of the research assistants indicated they were conducting a study on college student drinking and asked if they would answer a few questions about DD. They were told their results would be kept strictly confidential and they would be free to withdraw at any time. Individuals who declined to participate left the setting quickly; thus, researchers were unable to collect demographic data on them.

2.4. Questionnaire and BAC assessment

Those willing to participate and who reported they would return to their residence in a vehicle that night completed an informed consent form. A researcher recorded group information and asked the participant questions from a survey form. Research assistants recorded the following information from those who agreed to participate: (a) the number of individuals in the group, (b) the gender of each individual in the group, (c) which group members would be willing to have their BAC measured, and (d) whether the group had a DD. Researchers then recorded demographic information for each individual participant, including gender, age, student status, Greek-life affiliation, residence, and class standing.

Following a few questions related to demographics and drinking history, each participant was asked: (a) whether their group had a DD, (b) when the group chose the DD, and (c) whether they were the group's DD. Then, each participant's BAC was assessed with a breathalyzer. The level of intoxication was confidentially reported to the participant, and if the BAC registered 0.05 or above, the individual was strongly advised not to operate a motor vehicle. If the participant reported being less than 21 years of age and the BAC registered 0.02 or above, the individual was strongly advised not to drive. Each participant was reminded

Table 1
ANOVA for BAC

Source	<i>df</i>	MS	<i>F</i>	<i>P</i>
Gender	1	519.7	18.86**	.000
Driver type	1	348.5	12.65**	.000
Gender × Driver type	1	109.5	3.97*	.047
Error	257	(2755)		

Value enclosed in parentheses represents mean square error.

* $P < .05$.

** $P < .001$.

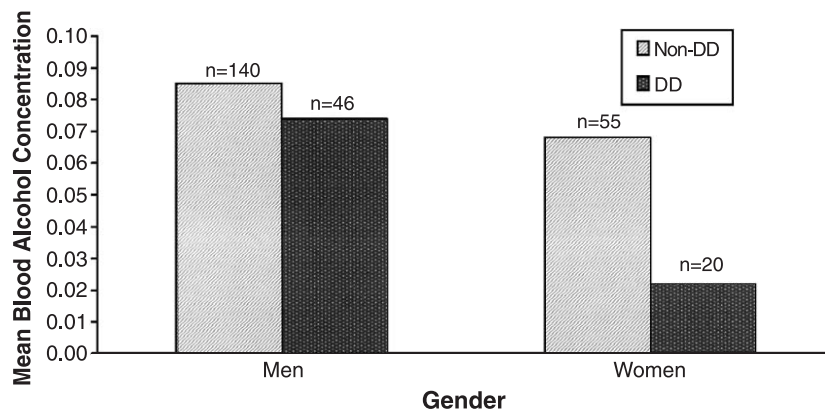


Fig. 1. Mean BAC by gender and driver type.

of the dangers involved with operating a motor vehicle after consuming any amount of alcohol. A ride home or bus fare was offered for any intoxicated person who said they planned to drive.

3. Results

A total of 807 groups were approached throughout the sampling period. When asked to answer a few questions about DD, 60% ($n=480$) of the groups approached agreed. A total of 457 individuals (321 men and 136 women) from these groups had arrived downtown in a motor vehicle and participated fully in the study.

3.1. BAC of DD vs. non-DD

A 2 Gender \times 2 Driver type (DD vs. non-DD) analysis of variance (ANOVA) was calculated on individual BAC. As depicted in Table 1, the ANOVA resulted in significant main effects for Gender [$F(1,257)=18.9$, $p<.001$] and Driver type [$F(1,257)=12.7$, $p<.001$] as well as a significant Gender \times Driver type interaction [$F(1,257)=3.97$, $p<.05$]. Men ($M=0.088$) were more intoxicated than women ($M=0.067$) and non-DD ($M=0.082$) were more intoxicated

than DD ($M=0.060$). As illustrated in Fig. 1, the interaction was primarily due to female DD being more sober than male DD. The mean BAC was 0.074 for male DD ($n=46$) and 0.085 for male non-DD ($n=140$). In contrast, the mean BAC was 0.022 for female DD ($n=20$) and 0.068 for female non-DD ($n=55$).

3.2. BAC levels of passengers

A 2 Gender \times 2 Passenger type (members of a group with DD vs. without DD) ANOVA was performed on the BAC of vehicle passengers. No effects were significant (all p 's $>.10$). In other words, the mean BAC of passengers with DD ($M=0.086$, $n=134$) was not significantly higher than the mean BAC of passengers without DD ($M=0.084$, $n=69$), and there was no significant difference between the BAC of male and female passengers.

3.3. Group size and use of a DD

A χ^2 analysis indicated that having a DD was significantly dependent on the size of the group [$\chi^2(3)=10.8$, $p<.05$]. As depicted in Fig. 2, the probability of having a DD varied directly as the size of groups increased from three to four and five or more. The percentage of DD in two-

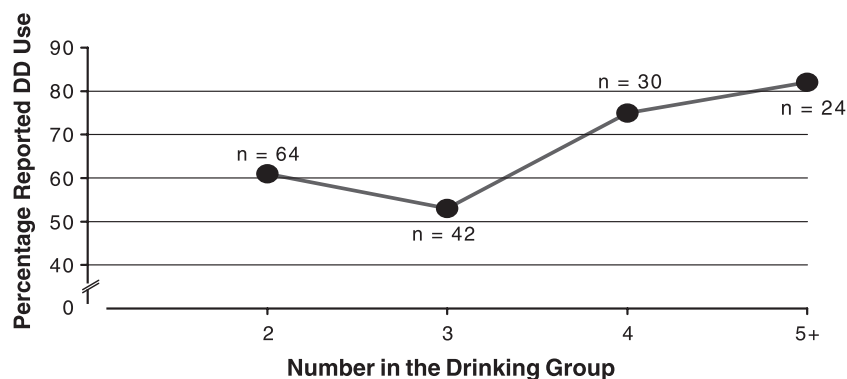


Fig. 2. Percentage reported DD use by group size.

person groups was greater than three-member groups, but this difference was not statistically significant [$\chi^2(1)=1.12$, $p>.10$].

Other χ^2 analyses indicated that groups of three were significantly less likely to report having a DD than groups of four [$\chi^2(1)=5.29$, $p<.05$] and five or more members [$\chi^2(1)=7.82$, $p<.01$]. In addition, groups of two were significantly less likely to report having a DD than groups of five or more [$\chi^2(1)=4.79$, $p<.05$]. No other comparisons were significant (p 's $>.10$). In response to the question regarding when the group chose the DD, 75% reported their group chose the DD before drinking, 15% reported they chose the DD while drinking, and 10% reported they chose the DD after they were finished drinking.

4. Discussion

The results supported the hypothesis that non-DD would be more intoxicated than DD ($P<.001$), giving some support to the utility of DD programs as a way to combat DUI and related injuries. Also, it was encouraging that 75% of the participants reported they selected their DD prior to going out, thus indicating a proactive stance toward safety and health. However, the definition of a DD is someone who agrees to *abstain from drinking alcohol* and drives for one or more other persons who have consumed alcohol (Barr & MacKinnon, 1998). Although the mean BAC of DD was below the legal limit of intoxication in Virginia (i.e., 0.08), they did not abstain from drinking alcohol ($M=0.060$). In addition, even more startling is that their mean BAC was above the intoxication level at which psychomotor impairment begins (0.05; Bailey, 1993).

Contrary to the hypothesis regarding the effect of having a DD on the intoxication of other group members, no significant differences in intoxication between participants with and without a DD were found. This finding contradicts the common criticism that DD programs promote reckless alcohol consumption by a DD's passengers (Dejong & Wallack, 1992). However, the mean BAC of both male and female passengers was found to be above the legal limit for driving regardless of whether they were using a DD. This is alarming, particularly for the participants who did not have a sober DD. This finding shows a severe problem of alcohol consumption in a university community and indicates that the DD approach is clearly not a quick-fix solution.

As hypothesized, the percentage of groups having a DD increased generally with the size of the drinking group, from 57% ($n=184$) of groups with three or fewer vehicle occupants to 79% ($n=69$) of groups with four or more. In general, the larger groups were more likely to report having a DD. While Knight, Glascoff, and Rikard (1993) found that DD behavior was influenced by the type of passenger group with which a driver was associated (i.e., friendship groups reported greater DD use), there is little research to date on

the influence of group size on DD use. The next step is to determine the reasons behind the moderating impact of group size. Is DD use perceived as something only necessary for larger groups? Does the social pressure in a larger group influence more DD behavior? Or, is there more planning about how to prevent DUI when more individuals are involved? These are just a few possible follow-up research questions prompted by the observed impact of group size on DD use.

The results suggest using male DD in a college community may not help to prevent alcohol-impaired driving. Specifically, male DD did not have significantly lower mean BAC levels than male non-DD. Consistent with the characteristics of the self-report data collected by Dejong and Winsten (1999), women stayed more sober than men when serving as a DD. Similarly, the survey research by Svenson, Jarvis, and Campbell (1994) found that university women generally reported healthier attitudes than men concerning alcohol consumption, including the use of DD and the prevention of DUI. Their male counterparts were more likely to report that it is socially acceptable to be intoxicated occasionally and that most drinkers do not suffer health problems as a result of drinking. In addition, Marcil et al. (2001) found that male university students report perceived behavioral control when driving intoxicated, which could influence a male DD's choice to remain sober. The assessment of actual BAC was a strength in this study and highlighted critical discrepancies between actual behaviors associated with DD use (i.e., abstinence from alcohol) and reported intentions of students to serve as DD.

While this study provides evidence on the likelihood of irresponsible drinking behavior by DD, particularly among males, two limitations are noteworthy. While this measure of actual BAC was more objective than the typical self-report data used in this kind of research, the authors did not assess whether the reported DD actually followed through on their commitment to drive the group home. In other words, it is not known whether the DD reports matched real-world behavior.

A second limitation of the present research is that the BAC sample may have been somewhat selective. Due to the applied nature of this research, it was not possible to obtain demographic nor BAC data from individuals who refused to participate, therefore making it impossible to determine any systematic differences between participants and nonparticipants. It is possible that those who agreed to have their BAC assessed were more likely to consume large amounts of alcohol. In other words, the length of the questionnaire and the absence of incentives other than a BAC assessment may have dissuaded participation by those who consumed less alcohol. It is likely that those who drank more alcohol were more interested in obtaining a BAC, as observed in prior BAC assessments at fraternity parties (Geller & Glinde-mann, 2000). Future research could control for this artifact by providing extrinsic incentives for participation. Nevertheless, even if the sample was biased in the direction of

high BAC, the dangerous impairment of male participants claiming to be a DD implicates the need and direction for focused intervention.

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