The Use of Designated Drivers to Deter Alcohol-Impaired Driving: 
Is this a Viable Intervention for a College Community?

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(Abstract)  
The use of a designated driver (DD) is reportedly a successful and cost effective way to  
reduce the number of injuries resulting from driving under the influence of alcohol. Benefits of  
using a DD are that it promotes the social norm of drinking abstinence, legitimizes the non-  
drinking role, offers a specific and modest behavior change to avoid DUI, and encourages  
planning ahead in drinking situations. However, DD programs have been criticized by those who  
feel these programs ignore the negative implications of drinking as distinct from drinking and  
driving, and may actually encourage excessive drinking among passengers. Furthermore, whether  
the DD actually abstains from alcohol has remained an empirical question. The current study  
examined the blood alcohol concentration (BAC) levels of male and female designated drivers and  
passengers of designated drivers leaving drinking establishments in a university town. A 2 (Male  
vs. Female) x 2 (DD vs. Non-DD) ANOVA indicated a main effect for gender, a main effect for  
driver type, and a significant interaction for gender and driver type. The interaction was due to a  
greater reduction in BACs for female than male DDs. The mean BAC for male DDs (n = 46) was  
.074, and the mean BAC for male non-DDs (n = 140) was .085. In contrast, the mean BAC for  
female DDs (n = 20) was .022, whereas the mean BAC for female non-DDs (n = 55) was .068.  
On average, vehicle passengers interviewed had BAC levels above the legal limit of .08 in  
Virginia. A direct relationship was found between the size of the social group and the probability  
of the group having a DD. More specifically, 79 % of groups (n = 69) with four or more drinkers  
had a DD, whereas only 57 % of groups (n = 184) with three or fewer drinkers had a DD.  
Implications for the future development of DD programs are also discussed.
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Finally, I would like to dedicate this work to my mother, Mrs. Annette T. Timmerman. Her unrelenting faith and love enabled me to believe, after losing almost everything, I could once again reach for the stars. If not for her spirit and grace, I would not be where I am today.

This is for you, mom.
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By numerous accounts, alcohol abuse is considered the number one drug problem facing young people today (Simin, Siegel, Brewer, Mokdad, Sleet, & Serdula, 1997). Alcohol consumption among college students has long been considered the norm rather than the exception (Maddox, 1970), and negative consequences associated with drinking and driving continue to have devastating effects on the college student population. It is predicted that 240,000 to 360,000 of our nation's 12 million undergraduates will ultimately die from alcohol-related causes – more than the number who will receive masters and doctorate degrees combined (Eigen, 1991). Additionally, more than 40 percent of all 16-to-20 year old deaths result from motor vehicle crashes, with about half of these fatalities directly related to drinking and driving. In 1996 alone, 32 percent of all traffic fatalities occurred in crashes in which at least one driver or pedestrian had a BAC (blood alcohol concentration) of .10 or greater (NHTSA, 1996). More than two-thirds of people killed in such crashes were themselves intoxicated, with the remaining one-third being passengers, nonintoxicated drivers, or nonintoxicated nonoccupants or pedestrians.

The fatality analysis reporting system (NHTSA, 1999) compiled statistics on all drivers involved in single vehicle crashes by age and BAC level in 1997 and found that nationwide, 57% of drivers (n = 3794) age 16 to 34 years had BAC levels greater than .10. In Virginia, it was found that 53% of those (n = 100) had BACs over .10. With regard to driver fatalities by gender and BAC, statistics showed that nationwide, 84% of male casualties (n = 5864) and 16% of female casualties (n = 1107) had BAC levels over .10. In Virginia, 85% of male casualties (n = 159) and 15% of female casualties (n = 27) had BACs greater than .10. Additionally, in 1997, 33% of pedestrian fatalities in Virginia involved individuals with BACs greater than .10 (n = 29).

In response to alcohol-related tragedies, colleges and universities have developed prevention/intervention programs based on models with varying degrees of effectiveness.
Unfortunately, these strategies, typically based on information obtained through national samples, have failed to live up to optimistic expectations. Attempts at successful interventions may occasionally result in effective programs to battle alcohol abuse, but if other factors associated with the actual drinking behavior among students are not taken into account, many programs will continue to fail, leading to the misapplication of scarce human and financial resources (Scoot & Ambroson, 1995).

Alcohol-impaired driving has long been a serious offense. Approximately 1.4 million drivers in the United States were arrested in 1995 for driving under the influence of alcohol or narcotics. This is an arrest rate of one for every 123 licensed drivers (NHTSA, 1996). As a result of such grass-root organizations as Mothers Against Drunk Driving (MADD) and Remove Intoxicated Drivers (RID), states have enacted numerous new drunk-driving laws since the early 1980s (National Commission against Drunk Driving, 1985). The problem is that tougher legal sanctions such as lowering the blood alcohol level to .08 in a growing number of states, raising the drinking age to 21, and prompt license suspension have yielded only weak and temporary reductions in drinking and driving casualties (Geller, 1988; Snortum & Berger, 1989).

Despite the intolerance posited by government officials and state legislatures, individual communities throughout the nation continue to suffer the negative effects of drinking and driving. Communities need to address this issue as it relates to the selective needs inherent to that particular community. Then substantial headway can be gained in preventing injuries and deaths caused by alcohol-impaired driving. The present research examines issues related to one particular community-based approach toward solving this societal problem – the promotion of a designated driver (DD) program.
Historical Context of Drunk Driving Prevention Strategies

From their comprehensive review of drunk driving prevention strategies, Russ and Geller (1985) concluded that of methods designed to counter driving under the influence, the majority have resulted in only transitory and minimal effectiveness. Methods for preventing drinking and driving have included using legislative approaches such as increasing the legal drinking age to 21, citizen/community efforts such as promoting SADD within the school system, individual interventions such as taking limited cash to drinking establishments or alternating alcoholic and non-alcoholic beverages, self-testing devices, BAC nomograms, and behavioral community interventions. While these strategies raise awareness of the DUI problem, initiating and maintaining beneficial behavior change regarding drinking and driving among college students continue to elude us.

Upon examination of DUI interventions, the application of punitive strategies and strict law enforcement for deterring drunk driving has not made a substantial impact on alcohol-related incidents. While the threat of punishment influences some individuals to avoid drinking and driving, the majority of drinking drivers remain on the highway. It is estimated that only one in 500 to one in 2000 drivers on the road who are legally intoxicated with a BAC of greater than .10 are actually arrested (Russ & Geller, 1985). Such findings indicate that a large number of intoxicated drivers remain on the roads without ever being caught. It is plausible the current emphasis on individual legislative accountability has not been sufficient to warrant fluency in responsible alcohol use and safe driving practices among those most at risk for alcohol-related injuries.

Based on ineffective results at the legislative level, many have attacked this problem with other means. For example, several communities have approached the problem of drinking and
driving through structural and environmental changes. Environmental interventions designed to reduce alcohol-related problems have typically been directed at local populations and have used comprehensive approaches based on the premise that alcohol problems arise through an interaction of individual, interpersonal and social factors (Holder, Saltz, Grube, Voas, Grunewald, & Treno, 1997). Components of these types of interventions generally include the mobilization of community organizations and the garnishing of their support for the project, establishing standards for servers of on-premise alcohol outlets, increasing the efficiency of local DUI enforcement, reducing the availability of alcohol to minors, and mobilizing the use of local zoning powers to reduce the availability of alcohol. Process evaluations of a program which targeted a specific community in the state of Massachusetts found that a majority of these types of community interventions produced a 25% reduction in fatal crashes compared to five years before, and fatal crashes involving alcohol decreased by 42% (Holder et al., 1997). Not only are such results encouraging, they also bring attention to the fact that a promising method of attacking alcohol-related problems might be through community-based solutions that involve the local citizens.

In the early 1980s, researchers in San Francisco conducted workshops for local agencies and interest groups to raise concern about alcohol problems and develop a plan of action for the community (Wallack, 1985). Structural and environmental community changes included alcohol education workshops for representatives of local agencies and interest groups, as well as the establishment of server training and related hospitality standards. A New Zealand project initiated in the mid 1980s used the mass media and various community organizations to support and enact specific policies to reduce alcohol-impaired driving (Casswell & Gilmore, 1989). Subsequent evaluation of the project found that mass media and local community programs received positive
support for these types of interventions. Such evidence reinforces the point that while community
sponsored programs have failed to reach many of those at greatest risk for DUI, they have
provided an effective method of substantially reducing alcohol-related crashes.

Other drinking and driving interventions have focused on attacking the problem at the
places where alcohol is being served. More specifically, attempts have been made to teach servers
of alcohol how to recognize the signs that indicate excessive alcohol use. Then when intoxication
is indicated, intervention strategies are implemented to reduce impairment or the probability of
DUI. The interventions include offering food or nonalcoholic beverages, slowing down the
serving of alcoholic drinks, encouraging the person not to drive, and finding alternative
transportation when necessary (Russ & Geller, 1988).

Behavioral intentions may also be used to customize an alcohol-related intervention
package according to levels of anticipated alcohol use. For example, people who are planning to
drink could give an estimation of their intended level of intoxication prior to the drinking
opportunity, and then others could monitor individuals planning to get impaired and provide those
at-risk for DUI with a safer means of transportation (Glindemann, Geller, & Ludwig, 1996).
However, this type of intervention requires special behavioral support and effort within the
environmental context, and this may be unavailable. What is needed is a comprehensive approach
that creates an environment that supports low to moderate alcohol consumption, targets both
individual and environmental factors, and uses behavioral interventions to motivate change
(Clarke & Geller, 1998).

Other preventive measures have been directed at assessing the role that individual factors
play in the persistence of alcohol-related problems. At the individual level, the most commonly
employed approaches are information dissemination, education, skills training, counseling and
persuasive communication (Basch, DeCicco, & Malfetti, 1989; Clarke & Geller, 1998). While increasing the availability of such programs and services is important, it has failed to have a significant impact on the drinking problem of college campuses (Clarke & Geller, 1998). A major weakness of such programs is the assumption that they reach all levels of the drinking population regardless of the unique drinking patterns of each individual.

Several field studies have yielded intervention-relevant information on college students’ drinking patterns. Geller, Altomari, Russ and Harwood (1984) unobtrusively observed college students drinking in college bars and found that while males tended to drink more than females, there was little difference in the rate of alcohol consumption for both genders when drinking in groups. It was further noted that individuals in these settings were only accurate 31% of the time when asked about the number of drinks they had consumed. Approximately 60% of the students reported they believed they were less intoxicated than they actually were (Russ & Geller, 1985). This is a troublesome finding, since a number of those individuals took the wheel of a car.

For the maximum impact, DUI interventions should be enacted at the time and place where alcohol-impaired driving is most likely to occur (Geller, Winett, & Everett, 1982). Glindemann, Geller, Clarke, Chevaillier, and Pettinger (1998) gathered epidemiological data on college student alcohol consumption while providing BAC feedback to pedestrians in a college community. Conducted over three consecutive years, observations indicated an alarming number of both male and female college students getting intoxicated and placing themselves and others at risk for alcohol-related crashes. Their findings suggested that BAC levels rose progressively throughout the night, and were highest on Thursday and Friday nights. Interestingly, no significant differences in BAC levels were found between men and women. Perhaps this reflects a
disappearing gender gap between levels of intoxication that self-report data has not been able to detect (Glindemann et al., 1998).

In the college student population, male students are more likely to drink and experience more alcohol-related problems than female students (Clark & Geller, 1998). Again, many of these studies have consistently relied on self-report data rather than BAC levels. Field research conducted in a fraternity party setting failed to show differences in BAC levels of men and women as they left at the end of the drinking event (Geller & Glindemann, 1996; Glindemann, Geller and Fortney, 1997). One aspect of the current study includes exploring whether the gender gap continues to be narrowing with regard to driving decisions.

Dejong and Winsten (1999) stated that among students who drink alcoholic beverages, those more likely to serve as a DD were female, white, over 21 years of age, and members of fraternities and sororities. Of their sample, 12% of the drinkers who had served as DDs in the past 30 days had driven after consuming five or more drinks, and 4% had done so two or more times. Twenty five percent also reported having ridden with an impaired driver in the past 30 days. Interestingly, these results did not specify the gender breakdown of drinkers involved with DD use over the past 30 days.

Primarily relying on self-report data has proven ineffective in making a substantive impact on understanding the factors that influence drinking and driving decisions. This research sets out to examine whether abstention is indeed the case among those who report to be behaving responsibly in the role of the designated driver. Additionally, research has neglected to consider factors associated with the levels of intoxication exhibited by vehicle passengers who are likely to possess a false sense of security when appointing a designated driver. The current research
studied this by measuring the BACs of male and female designated drivers and vehicle passengers with and without a designated driver.

**Designated Driver Programs as Interventions**

The use of designated drivers has been considered to be among the most successful approaches for reducing the problems of drinking and driving on college campuses (Eigen, 1991). Originating in Scandinavian countries, designated driver (DD) programs in retail drinking establishments began to flourish in the mid to late 1980s (Aspler, Harding, & Goldfein, 1987). According to the Harvard Alcohol Project (Winsten, 1994), the benefits of using DDs are that they promote the social norm of drinking abstinence, legitimize the nondrinking role, offer a specific and modest behavior change as a way to avoid DUI, and encourage proactivity with regard to self-monitoring alcohol intake. Overall, proponents of having these types of programs implemented in communities contend that the DD program is a simple and straightforward concept that can be easily integrated into mass communication messages as a way to ultimately change social norms (Glascoff, Knight, & Jenkins, 1994).

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). The use of a DD is important because it may prevent some of the 22,000 yearly alcohol-related fatalities, and the 289,000 yearly alcohol-related injuries (Eigen, 1991). Other advantages associated with DD use include the low costs of implementing this strategy and the focus on group involvement in choosing a DD which may subsequently aid in bolstering the norms against drinking and driving.

The implementation of DD programs in college settings is not uncommon. Knight, Glascoff, and Rikard (1993) found that a majority (88%) of college students at one university
setting either had served as or used a DD. They also learned that the job of a DD can be quite complicated and challenging. Specifically, the responsibilities include monitoring activities during the drinking event and caretaking/intervention activities during and after the drinking event. Examples of caretaking activities include trying to control the behavior of those drinking, tending to passengers who may have gotten sick or passed out, putting passengers to bed, and following up on passengers the next day. While knowledge pertaining to the seriousness of the role of a DD is widespread, actual alcohol consumption rates and high-risk behaviors displayed by DDs remains a probative question.

Dejong and Winsten (1999) examined self-report data from a representative sample of students (n = 17,592) attending 140 four-year colleges. Among those reporting to have consumed alcohol in the past year, 53% of the students who served as a DD in the past 30 days said they did not consume any alcohol the last time they served in the role of a DD. An additional 26% said they consumed one drink and another 19% reported having consumed more than one drink when performing the role of DD. This is a troublesome finding due to the fact that a driver with a BAC of .05 is about twice as likely to be involved in a fatal traffic crash than an individual who has consumed no alcohol whatsoever due to impaired psychomotor performance (Sleet, Wagenaar, & Waller, 1989).

Due to the fact that DD use is inherently a group behavior, the groups with which individuals drink may also have an impact on the effective use of DDs. Variables such as group size, gender composition of groups, and the drinking patterns of group members might affect the actual behavior associated with DDs. Research has indicated 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). Research is needed
to evaluate factors that may be influential in determining the efficacy of DD programs in their current form.

Critique of Designated Driver Programs

The designated driver concept may be simple and straightforward, but it has led to a heated debate among public health officials and traffic safety experts over what is and is not an appropriate strategy for combating alcohol-related injuries. Some critics have speculated that DD programs may actually do more harm than good (DeJong & Wallack, 1992). As such, DD programs ignore the negative implications of drinking as distinct from drinking and driving, and imply that it's "okay" to drink as much as you want as long as you do not drink and drive (Glascoff et al., 1994). Prominent researchers in the field of drinking and driving (e.g., Aspler et al., 1987; DeJong & Wallack, 1992; Stewart, 1992) cite numerous drawbacks, including a deflection of attention from other efforts to prevent drinking and driving. These drawbacks further include a focus on individual change with little emphasis on environmental or social factors that may be encouraging excessive alcohol consumption. Specifically, the presence of a DD may actually encourage passengers to consume more alcohol than normal.

Thus, a common criticism levied against the DD concept is that it encourages or gives tacit approval to excessive drinking by the DD’s companions (Mosher, 1991). This may be of special concern among college students, many of whom engage in binge drinking (Glindemann et al., 1998). Critics argue that having a DD may encourage excessive alcohol consumption among those who ordinarily would monitor their drinking behavior in a more responsible manner (Seal, 1990). For this reason, guidelines presented by the Office of Substance Abuse Prevention (OSAP) explicitly prohibit promotion of the DD concept (OSAP, 1989). This study examined whether this denunciation is supported by objective field observations obtained within the drinking
environment. More specifically, this field research determined whether drinking groups with a DD get more impaired than those without a DD.

The theory of danger compensation (Wilde, 1982) states that at any point in time, people perceive and accept a certain level of risk. When accepted levels of risk are not in equilibrium, one may alter his [her] behavior to bring perceived and acceptable levels of risk into homeostatic balance. According to risk homeostasis theory (Wilde, 1982), passengers with a DD should get more impaired than passengers without a DD. In other words, individuals with a DD perceive and accept a level of risk that they would not ordinarily accept if driving themselves. Therefore, a DD reduces the risk of driving while intoxicated and in turn provides the occasion for more drinking. Based on the assumption of risk compensation, it can be inferred that the use of a DD may indeed have a significant impact on the amount of alcohol consumed by passengers, and consequently affect the designs of future DD programs.

Another potential problem with DD programs is the special challenge of the DDs themselves. Glascoff et al. (1994) found that only 33% of college students who acted as DDs actually abstained from consuming alcohol. More than 60% of the respondents (n = 288) agreed that DDs 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. Such findings suggest that DDs among college students might not always abstain from alcohol consumption.

To summarize, the current field study assessed the BACs of university students leaving downtown drinking establishments after consuming alcohol. Through interpersonal interviews, the size of the drinking group was assessed as well as whether an individual was a DD for a particular drinking group. The following research hypotheses were entertained:

1. Designated drivers will have lower BACs than non-designated drivers.
2. Female designated drivers will have lower BACs than male designated drivers.
3. The probability of a group having a DD will increase directly with the size of the group.
4. Members of groups with a DD will have higher BACs than members of groups without a DD

**Method**

**Participants and Setting**

Field observations were taken on Wednesday and Thursday evenings over seven consecutive weeks during the Fall semester of 1998 (Oct. 8\textsuperscript{th} – Nov. 19\textsuperscript{th}) in the downtown area of Blacksburg, Virginia. Including the 25,000 students of a large university, the town has a population of approximately 40,000. The majority of participants were university students between 18 and 25 years of age. The Chief of Police of Blacksburg, Office of the Mayor, Town Manager, and Downtown Merchants Association were informed of this study and offered enthusiastic approval.

**Apparatus**

Participants' blood alcohol concentrations (BACs) were estimated using hand-held Alco-Sensor III and IV breathalyzers (accuracy = +/- .005; Intoximeters Inc., 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 that alveolar (i.e., deep lung) air was collected. All instruments were calibrated by the local police department immediately before the study. Precision lasts approximately three months.

**Subject Recruitment**

Trained undergraduate research assistants were stationed in three public areas in downtown Blacksburg on Wednesday and Thursday evenings from 9:00pm - 2:00am during the
1998 Fall semester. Groups consisting of two or more individuals were approached at random and the following information was recorded on a special data sheet: a) the number of individuals observed in the group, b) the gender of the individuals in the group, c) whether the group agreed to participate in the study by having their BACs measured, c) and whether the group reported having a DD. Those who declined to participate were asked only one question, "Have you chosen a designated driver tonight?" (see Appendix A for a copy of the data sheet used to record all responses).

**BAC Assessment**

The individuals agreeing to participate were instructed about the study using the designated driver study protocol. Research assistants recorded the group number, number of individuals, and gender of individuals on the data sheet. The assistants stated, “Hi, my name is ____. Would you like to have a free BAC? If so, we are conducting a study on college student drinking and we will need to ask you a few questions. Those willing to participate completed an informed consent form and questionnaire. The participant’s BAC was assessed and recorded on the data sheet. The level of intoxication was reported to the participant and the individual was strongly advised not to operate a vehicle if BAC registered .05 or above. If the participant was under 21 and the BAC registered .02 or above, the individual was strongly advised not to drive. Each participant was reminded of the dangers involved with operating a vehicle after consuming any amount of alcohol (see Appendix B for a copy of DD study protocol).

Informed consent forms were obtained during subject recruitment for each participant. Participants were informed that the results would be kept strictly confidential and they were free to withdraw at any time (see Appendix C for a copy of the informed consent form).
The following demographic information was obtained from each participant: a) gender, b) age, c) student or non-student status, d) Greek affiliation or not, e) residence location, and f) class standing. Then, a research assistant asked questions to assess the following: g) whether the individual would be leaving in a vehicle that evening, h) whether the individual’s drinking group had a DD, i) whether the participant was a DD, j) when the person was chosen as the DD, k) whether the alcohol consumption of the person selected as the DD was considered prior to selection, l) how many times the participant had served the role of DD over the past 30 days, m) how many times someone else in the participant’s drinking group had served in the role of a DD over the past 30 days, n) how many times over the past 30 days the individual had consumed five or more alcoholic beverages in one sitting (if male) of four or more alcoholic beverages in one sitting (if female), o) at what time the individual began drinking that day, p) the approximate number of alcoholic beverages the individual had consumed, and q) an estimation of the individual’s current level of intoxication using a behavioral ranking scale. (see Appendix D for the data sheet used to record demographic information and the individual’s responses to the previous questions).

Following the one-to-one interview, the participant’s BAC level was assessed and recorded. The participant was confidentially informed of their current level of intoxication. If the BAC registered .05 or above, the individual was strongly advised not to operate a vehicle, and a ride home or bus fare was offered. Finally, each subject was thanked for participating and reminded of the dangers in operating a motor vehicle if any amount of alcohol had been consumed. This study received approval by the Human Subjects Committee and Institutional Review Board and all participants were treated within the ethical guidelines put forth by the American Psychological Association.
Results

The results section is divided into three subsections. The first section presents the descriptive statistics for the observational data. The second section presents the descriptive statistics for the DD questionnaire, and the third section presents the statistics related to the research hypotheses.

Observational Data

Descriptive statistics for each of the categories on the participation sheet are presented in Table 1. The total number of groups observed throughout the sampling period was 807. Of this total, 48% consisted of two individuals, 24% included three individuals, 16% consisted of four individuals, and 12% had five or more members. With regard to gender composition, 43% of the groups included only males, 23% were composed of only females, and 34% of the groups had both male and female members.

When asked to participate in the study, 60% of the groups approached agreed to answer the questionnaire (n = 480) and 40% of the groups (n= 327) declined. Of all groups agreeing to participate, 457 individuals took the questionnaire and had their BACs assessed. All of the groups observed, irrespective of participation, were asked whether or not the group had chosen a DD for the evening. Fifty-one percent (51%) of the 807 groups observed said they had a DD, 12% responded that they did not have a DD, and 37% indicated they were not using a vehicle (see Appendix E for observational sheet responses).

Designated Driver Questionnaire

Table 2 displays the descriptive statistics for each of the items on the DD questionnaire. A total of 457 individuals in downtown Blacksburg agreed to be interviewed and have their BAC assessed. Of the respondents, 70% were male and 30% were female. The ages of the participants
ranged from 17 to 41 years with a mean age of 21.4. Ninety-one percent of this sample said they were university students (n=418), 53% of the college sample (n = 221) reported belonging to a Greek organization, and 86% of the college students indicated they lived off campus (n = 359). Of the student sample, 5% were freshmen (n=22), 14% were sophomores (n=58), 28% were juniors (n=115), 49% were seniors (n=204), and 5% were graduate students (n=19).

Fifty-two percent of the drinking groups (n=240) indicated they would be leaving the downtown area in a vehicle that evening with 53% of these groups (n=127) reporting to have a DD. With regard to gender, 27% of the female participants (n= 20) reportedly were DDs, and 25% of the male participants (n= 46) reported to be DDs.

When asked the question, “when did you determine who would be the designated driver that evening”, 75% of the sample (n = 217) stated that the DD was chosen prior to going out, 15% stated that the DD was chosen sometime during the evening (n=43), and 10% reported that the DD was chosen at the end of the evening (n=18). With regard to whether alcohol consumption was considered to be a factor in the choice of the individual as the DD, 60% reported it did play a role in the selection (n=166), but 40% explicitly stated that alcohol consumption was not a factor in the selection process (n=107).

Both female and male participants admitted to being a DD approximately two times within the past 30 days. Females (n = 136) reported using a DD an average of five times over the past 30 days, whereas males (n = 321) reported using a DD an average of four times during the past 30 days.

Regarding the question on binge drinking, males reported consuming five or more alcoholic beverages at one sitting an average of six times over the past 30 days, and females reported consuming four or more alcoholic beverages at one sitting an average of four times
during the past 30 days. The mode time the participants stated they began drinking that evening was between 8:00 and 9:00 p.m., and the average number of alcoholic beverages consumed that evening by males was seven, and the average number of alcoholic beverages consumed by females was four. Males tended to estimate their level of intoxication to be higher than females with mean estimations of .07 and .05 BAC levels, respectively (see Appendix F for designated driving questionnaire responses). Stepwise regression analysis indicated that actual BAC levels were predictive of estimated BAC levels, $F(2,22) = 5.51, p < .012$ with adjusted $R^2 = .27$. However, gender was not a predictor of estimated BAC levels.

**BACs of Designated Drivers vs. Non-Designated Drivers**

A 2 Gender x 2 Driver Type (DD vs. non-DD) analysis of variance (ANOVA) indicated a main effect for gender, $F (1,257) = 19.19, p < .001$, a main effect for DD vs. non-DD, $F (1, 257) = 12.70, p < .001$, and a significant interaction term, $F(1,257) = 4.85, p < .029$. (see Appendix G for ANOVA table).

As depicted in Figure 1, the interaction was due to a greater reduction in BACs for female than male DDs. The mean BAC for male DDs ($n = 46$) was .074, and the mean BAC for male non-DDs ($n = 140$) was .085. In contrast, the mean BAC for female DDs ($n = 20$) was .022, whereas female non-DDs ($n = 55$) had significantly lower BACs than male non-DDs ($M = .085$), $F (1,193) = 5.04, p < .026$. Male DDs did not have significantly lower BACs than male non-DDs, $F (1, 184) = 1.911, p < .169$. Interestingly, female non-DDs ($M = .068$) had significantly lower BACs than male non-DDs, (M = .085), $F (1,193) = 5.04, p < .026$. (see Figure 1).
Group Size and Use of a DD

An overall Chi-Square analysis indicated that the size of the group was significantly related to whether the group reported having a DD, $\chi^2 = 10.82$ (3), $p < .013$. As depicted in Figure 2, of the 260 total number of groups who participated in the interview, 61% of two-person groups ($n = 64$) reported having a DD, 53% of groups consisting of three individuals ($n = 42$) reported having a DD, 75% of groups consisting of four individuals ($n = 30$) reported having a DD, and 82% of groups consisting of five or more individuals ($n = 24$) reported having a DD.
Post hoc chi square analyses indicated that groups of two were significantly less likely to report having a DD than groups of five, $\chi^2 = 4.79(1), p = .029$. Groups of three were significantly less likely to report having a DD than groups of four ($\chi^2 = 5.29(1), p = .021$) or groups of five or more ($\chi^2 = 7.82(1), p = .005$). All other comparisons were not significant at $p < .05$ (see Appendix H for chi-square table).

**BAC Levels of Passengers with DDs vs. Passengers without DDs**

A 2 Gender (male vs. female) x 2 Passenger Type (with DD vs. without DD) ANOVA was performed on the dependent variable BAC. Results indicated no significant main effects for gender or passenger type, and no significant interaction. The BAC levels of passengers with DDs ($M = .086, n= 134$) were not significantly higher than the BAC levels of passengers without DDs ($M = .084, n=69$). On average, the male and female passengers in vehicles who were interviewed registered mean BAC levels over the legal limit of .08 in Virginia.

**Discussion**

The results of this study indicate that the drinking behaviors of designated drivers (DDs) and their passengers may pose a greater risk for alcohol-related injuries than indicated by previous research. The assessment of actual BACs in this study highlighted critical discrepancies between actual behaviors associated with DD use and the intentions of DDs to act in a responsible manner. Specifically, these findings suggest that DD programs may not always lead to a reduction in alcohol-related tragedies unless females are serving as DDs. In fact, the results of this field study suggest that using male DDs in a college community may actually be detrimental to preventing alcohol-impaired driving.
The current study suggests that responsible DDs were white and female, consistent with the characteristics of the self-report data collected by Dejong and Winsten (1999). This research indicates that DDs who consumed dangerous levels of alcohol were more likely to be men. In addition, only 60% of the group members stated that alcohol consumption was a factor in the choice of a DD. Both men and women reported to have served as a DD an average of two times over the past 30 days, and each gender group reported to have used DDs an average of four [males] to five [females] times over the past 30 days. It was encouraging that 75% of the individuals surveyed indicated that they selected their DDs prior to going out, thus indicating a proactive stance toward safety and health. Unfortunately, this finding was overshadowed by irresponsible alcohol consumption of the male DDs.

DDs had significantly lower BACs than non-DDs with mean BACs of .058 and .082, respectively. Male DDs did not have significantly lower average BAC levels than male non-DDs. However, female DDs did have significantly lower BACs than female non-DDs. This suggests that women take the role of a DD more seriously than men and thus behave in a more responsible manner. This conclusion is consistent with the results of survey research by Svenson, Jarvis and Campbell (1994) who found that university women (n = 280) generally had healthier attitudes than males (n = 177) concerning alcohol consumption including preventing others from driving drunk and using DDs. Men 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.

Of relevance to the current study, the assignment of a DD prior to going out was significantly more common among women than men, $F (1, 212) = 4.82, p < .049$. Eighty five percent of females (n=65) indicated choosing a DD prior to going out, whereas 74% of the men
(n=148) indicated choosing a DD prior to going out. Perhaps this reflects the influence of cultural factors that include the stereotype of the traditional masculine role, which emphasizes risk-taking, adventure-seeking, and confidence in performance skills such as driving. All of these male characteristics increase the likelihood a person will DUI even when feeling impaired. To give up the wheel because, “I’m not capable” might suggest a person is a “weakling” or a “sissy”. In contrast, females are often socialized to be more dependent and less competent with respect to the performance skills associated with driving (Geller & Lehman, 1988).

The gender differences in BAC levels of female and male DDs are consistent with previous research on the effects of gender on attitudes of alcohol consumption. Geller and Lehman (1988) found that males learn about alcohol at an earlier age and from different sources than females. For instance, males say they rely more on their own experience and input from friends, whereas females tend to gather information from family and mass media. Perhaps more women than men take the information relayed to the public on responsible DD use more seriously, and in turn, apply the information proactively to their lives. It is also possible that men continue to view themselves as more capable at controlling the risks associated with alcohol-impaired driving than females, and thus, reduce the importance of sobriety for a DD.

This study also found that the probability of a group having a DD increased directly with the size of the drinking group, from 57% of groups of three or fewer drinkers (n= 184), to 79% of groups of four or more (n=69). While Knight et al. (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. Perhaps small groups (3 or less) believe the appointment of a DD is primarily reserved for the larger social groups. An individual in a larger social group may sacrifice a “good time” for the
greater good, whereas this sacrifice among members of smaller groups may be perceived to be too
great. This misperception of the risks associated with drinking and driving, particularly in date
situations, must be brought to the forefront of effective program development. It is imperative
that the appointment of a responsible DD in all drinking situations, regardless of the number in the
group, be incorporated in future program design and dissemination.

There were no differences in the BACs of passengers with DDs and passengers without
DDs. However, the intoxication levels of those stating that they were not planning to drive but
would be vehicle passengers were on average above the legal limit of .08. In reference to Wild’s
(1982) risk homeostasis theory, those passengers with DDs did not alter their perceived and
acceptable levels of risk differently than vehicle passengers who did not have a DD. It is possible
that the alcohol consumption of passengers, regardless of who is driving, will be greater when
driving themselves (Barr & MacKinnon, 1998). The reckless drinking behavior of vehicular
passengers is consistent with a criticism posited by Dejong and Wallack (1992) who believe that
emphasizing the implementation of DD programs may imply that it’s okay to drink as much as
you want as long as you are not taking the wheel of a car. However, the present study suggests
the availability of a DD does not significantly influence the drinking behavior of passengers. More
research on the behaviors of the drinking group is needed to develop programs that promote the
social norm of drinking abstinence on the part of the driver while also emphasizing responsible
alcohol use among passengers.

While this study provides critical evidence on the likelihood of irresponsible drinking
behavior by DDs, particularly in the case of men, there are several drawbacks associated with this
research. While the added measure of BAC with self-report data offers a more effective means of
determining impairment in individuals who verbally report they are DDs, whether a particular
individual actually served as a DD in the final analysis remained unknown. In addition, it is possible the sample was selective. Perhaps only moderate to heavy drinkers were reinforced by having their BAC assessed and thus agreed to the interview. In other words, the length of the questionnaire and absence of incentives other than a BAC assessment may have biased the sample of participants. Future research should take such issues into account and design assessment strategies that focus on all drinkers, irrespective of consumption levels, who could be potential drivers.

**Future Directions**

**Actively Caring Model**

One way future research could focus on encouraging responsible alcohol consumption is by understanding factors related to responsible behavior in general. An actively caring model proposed first by Geller (1991a) provides a conceptual framework for identifying individuals who care enough about the health and safety of others to act accordingly. The actively caring perspective is analogous to the humanistic concept of self-transcendence (Frankl, 1962; Maslow, 1971; Schultz, 1977) which has been described as the giving of ourselves to a cause or another person, and is considered the ultimate state of human existence.

Most community-based behavior-change interventions require a voluntary change agents to deliver necessary training or education and motivating contingencies. This requires people to go beyond the call of duty for the benefit of someone else, and is considered actively caring (Geller, 1996). In the context of occupational safety, actively caring has been operationally defined as acting to benefit the safety of other workers.

From a review of the social/personality literature, Geller (1996) identified five personality states that are predictive of those willing to actively care, or go beyond the call of duty, when it
comes to influencing the safety of others. Specifically, individuals most likely to exhibit actively caring behaviors are presumed to have higher levels of self-esteem ("I am valuable"), self-efficacy ("I can do it"), personal control, ("I am in control"), optimism, ("I expect the best") and belonging ("I am a team player").

Geller (1995) hypothesized that environmentally responsible behaviors can be seen as altruistically motivated and analogous to actively caring behaviors. A test of this assumption by Allen and Ferrand (in press) found sympathy for environmental concerns to be facilitated by feelings of personal control, which is consistent with Geller's notion that personal control plays an important role in an individual's motivation to intervene on behalf of the environment (Geller, 1995).

Based on the aforementioned theory, an argument can be made that factors that increase actively caring for industrial safety (Geller, 1996) could also increase responsible drinking and use of a DD. It might also be possible to predict whether individuals are likely to perform the behaviors crucial for a safe DD. Given the actively caring model, it can be inferred that responsible DDs would score higher on measures of self-esteem, group cohesion, self-efficacy, optimism, and personal control. If it is not possible to select DDs on the basis of these personality dimensions, at least it may be possible to create a social context that facilitates these person states. For example, it is important to specify what a responsible DD does and build the DD’s personal control and self-confidence regarding the performance of these behaviors, all within the context of optimism and group solidarity or cohesion.

**Behavior-Based Interventions**

Other implications for future research to increase responsible DD behavior should focus on the development of behavior-based intervention programs to promote interpersonal safety and
reduce alcohol-related injuries. Behavior analysts have developed and evaluated numerous intervention tactics designed to increase the likelihood of safety-related behaviors (see reviews by Geller, 1988, 1990, 1996). Many have been applied at the community level such as increasing safety-belt use (Geller & Lehman, 1991) and using crosswalks to encourage pedestrian safety (Boyce & Geller, 1998). The behavior-change approach targets specific behaviors, and implements techniques designed to either increase or decrease the desired behavior. It has been found that in order to maximize the impact of an intervention, techniques should be matched to certain characteristics of the target population (Geller, 1989; Winett, Altman, & King, 1990).

Virtually all drinking and driving prevention programs fall short in the domain of marketing interventions relevant to the needs of specific subpopulations. The vast majority are designed and implemented on the assumption that each person perceives the use of alcohol and risks associated with alcohol use in very similar ways, and views DD programs as ethically and socially valid (Geller, 1991b). It is important to note that in order for an intervention program to be important from a societal perspective, or to have social validity, the intervention must be acceptable and usable by the population it is intended to influence (Geller, 1991b). Furthermore, future research must accentuate the importance of marketing these strategies towards college students in a way that is meaningful and emphasizes maintenance of the desired behavior (i.e., responsible designated driving behavior).

Results of behavior-based programs are promising for reducing the number of alcohol impaired drivers, however, marketing the programs in a meaningful way continues to be a primary shortcoming. A vital step in the development of effective interventions designed to deter alcohol-impaired driving is to select those individuals who are most at risk for intoxication. Therefore, it
is important to deliver an intervention program to these individuals in ways that are most appealing and likely to be adopted. This is social marketing.

**Social Marketing**

The basic principles of marketing recognizes the importance of the consumer to the success of business (Geller, 1989). A primary objective of marketing strategies is to take into account the interests of the target population. McCarthy’s four “P’s” are considered, when referring to the development of the right product, endorsed by the right promotion, put in the right place, and at the right price (Geller, 1989; Kotler & Zaltman, 1971). When designing interventions for the college student population it is important to remember that the product should be salient to college students, be promoted in the collegiate environment, implemented at the right place, and at a price appealing to that population. A problem with previous DD programs is the assumption that product, price, promotion, and place are considered equivalent across all target groups.

The social marketing approach offers an alternative to traditional alcohol education that emphasizes knowledge dissemination, awareness of risks, and fear tactics (Thombs, Dimintroff, Wolcott, Nickel, & Austin, 1996). Kotler (1982) defined social marketing as the design, implementation, and control of programs seeking to increase the acceptability of a social idea or cause in a target group.

Since previous research has indicated that the appeal of alcohol programming is quite low among college students (Black & Smith, 1994), marketing behavior change tactics acceptable to the individual target audiences may increase intervention compliance. Leadership from respected nonusers and sensible drinkers is key to promoting compliance with the law and can help to head
off rebellion that can accompany renewed efforts to enforce existing drinking laws and policies (Thombs et al., 1996).

The basic tenets of social marketing lend support to the necessity of identifying audience needs and characteristics before implementing prevention and intervention programs (Scoot & Ambroson, 1995). Understanding the needs and perceptions of the target persons within the environment is the first step in matching intervention strategies with individual characteristics (Geller & Nimmer, 1987). Market segmentation, target selection, and intervention development should be guided by research that can distinguish among what intervention is best suited for certain targets and situations (Geller, 1989).

The integration of social marketing strategies and applied behavior analysis allow for the specialization of behavior change strategies for particular subgroups. According to Geller (1989), an important step is to acquire information about relevant characteristics of the target individuals and define the limits to which the information can be generalized. Such information can lead to a better understanding of the type of intervention most meaningful and enduring in a particular setting. Following market segmentation, or partitioning the market by characteristics associated with a DD, assessment of the effectiveness of antecedent and consequences that support the increase of a desired behavior (i.e., responsible designated driving) can be systematically evaluated.
This research brought to the forefront the need to encourage responsible designated driver use among the college-age population. An example of social marketing and behavior-based intervention techniques to reduce alcohol-impaired driving among college students is the “Save Kenny Campaign” on the Virginia Tech campus in Blacksburg Virginia. As depicted below in Figure 3, the theme of the campaign focuses on a popular cartoon character from the series South Park who is killed in almost every episode. “Don’t Kill Kenny! … Support Designated Drivers” is designed to appeal to the college student population and encourage responsible DD behavior.

Several local drinking establishments are participating in the program by providing free “Bottomless DD cups” good for complimentary soft drinks to DDs. In addition, students can sign a pledge to be a responsible DD at various areas on campus, receive a cup, and have a chance to win prizes. It is predicted that the promotion of responsible DD behavior throughout the community will increase the social validity of abstinence among DDs and, in turn, reduce alcohol-related vehicular tragedies.

FIGURE 3 - Program to Increase the Frequency of Responsible DDs.
The assessment of this strategy will provide relevant information for creating DD programs that are not only more effective in reducing alcohol-impaired driving, but also more informative for the research community when developing marketing strategies for subgroups within the college student population. Future research should investigate the role of marketing behavior–based intervention programs in such a way that is pertinent to making the use of responsible designated drivers a socially accepted norm among college students at risk for DUI.
References


Geller, E.S. & Glindemann, K.E. (1996). Intervening with fraternities to decrease alcohol abuse. Final report for Grant #5 R01 AA09604-02 from the National Institute on Alcohol abuse and Alcoholism.


Appendix A

Participation Sheet
# DD Participation Sheet

Data Collector #: __________   Date: ______________

<table>
<thead>
<tr>
<th>Group #</th>
<th># in group by gender</th>
<th>Agree? (Y/N)</th>
<th>Group DD? (Y/N/Walk/Noresp)</th>
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<tbody>
<tr>
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</tbody>
</table>
Appendix B

Designated Driver Study Protocol
DD Study Protocol

1. Approach a group of potential subjects.
2. Fill out information on participant sheet.
3. Say to the group: “Hi, my name is ______________. Would you like to have a free BAC? If so, we are conducting a study on college student drinking and we will need to ask you a few questions.”

If participants agree:
4. Have subjects complete the informed consent forms.
5. Ask participants **ALL OF THE** questions on the questionnaire.
6. Assess the participant’s BAC, record BAC on data sheet, and inform participant of their level of intoxication.
7. If BAC registers .05 or above, **strongly advise the person not to drive** and offer a ride home or bus/cab fare if needed.
8. If person is under 21 and BAC registers .02 or above, **strongly advise them not to drive**. Remember, it is dangerous to operate a motor vehicle if a person has consumed ANY alcohol.

Thank the subjects for their participation.
Appendix C

Informed Consent Form
INFORMED CONSENT

Exp. #: ______________

PURPOSE OF EXPERIMENT. You are invited to participate in a study of college student drinking behaviors and the use of designated drivers.

PROCEDURES TO BE FOLLOWED IN THE STUDY. This questionnaire will be used to study current drinking practices and other factors related to designated driving among college students.

ANONYMITY OF SUBJECTS. The results of this study will be kept strictly confidential. At no time will the researchers release your results to anyone without your written consent. No identifying information will be obtained in this study.

DISCOMFORTS AND RISKS FROM PARTICIPATING IN THE STUDY. There are no known discomforts or risks.

EXPECTED BENEFITS. There are no expected benefits.

FREEDOM TO WITHDRAW. You are free to withdraw your consent and terminate your participation at any time. You are also free to decline to answer any specific items in interviews or on questionnaires.

CLASS CREDIT. Participation in this study can be used to fulfill research participation opportunities for Introductory Psychology and requirements for Field Study, Undergraduate Research, and Independent Study. Please note, there are many other opportunities to fulfill research participation hours, and there is no requirement that you participate as a subject in this study. Participation is voluntary, and you may withdraw at any time.

USE OF RESEARCH DATA. The information from this research may be used for scientific or educational purposes. It may be presented at scientific meetings and/or published and reproduced in professional journals or books, or used for any other purpose that Virginia Tech’s Department of Psychology considers proper in the interest of education, knowledge, or research.

APPROVAL OF RESEARCH. This research project has been approved by the Human Subjects Committee of the Department of Psychology and by the Institutional Review Board of Virginia Tech.

SUBJECT PERMISSION:
I have read the above description of the study.
I have had an opportunity to ask questions and have them all answered.
I hereby acknowledge the above and give my voluntary consent for participation in this study.
I further understand that if I participate I may withdraw at any time without penalty.
I understand that should I have any questions regarding this research and its conduct, I should contact any of the persons named below:

   Principle Investigator: E. Scott Geller 231-6223
   Secondary Investigator: Mary Ann Timmerman 552-6584
   Chair of Human Subjects Committee: David W. Harrison 231-6581
   Chair of Institutional Review Board: H. T. Hurd 231-5281

SUBJECT’S SIGNATURE: ___________________________ DATE:______________
SUBJECT’S ID: ___________________________ DATE:______________
WITNESS SIGNATURE: ___________________________ DATE:______________
EXPERIMENTER SIGNATURE: ___________________________ DATE:______________
Appendix D

Designated Driver Questionnaire
DESIGNATED DRIVER QUESTIONNAIRE

1. Will you be leaving downtown in a vehicle this evening? Yes  No

2. Does your group have a DD this evening? Yes  No

3. Are you a DD this evening? Yes  No

4. When did you determine who would be the designated driver?
   ____  Before we went out.  ____  At the end of the evening.
   ____  During the evening.  ____  Other:

5. Was the alcohol consumption of the person selected as the designated driver considered when selecting them as the designated driver? Yes  No

6. Over the last 30 days, how many times have you been a designated driver when using a car to go out drinking? ______

7. Over the last 30 days, how many times have you had someone else be a designated driver when going out drinking? ______

8. In the last 30 days, how many times have you consumed:
   For males: 5 or more drinks in a sitting?
   For females: 4 or more drinks in a sitting? ______

9. At what time did you start drinking today? I Haven’t  ____  AM

10. Approximately how many drinks did you consume while out tonight? (1 Drink = 12 oz. beer or 1.5 oz. shot or 1 mixed drink or 4 oz. wine). ______

11. Please estimate your current level of intoxication: ______

12. How did having a DD effect your drinking this evening:

   Had No Effect  You drank more than usual  You drank less than usual
Appendix E

Participation Sheet Descriptive Table
Table 1

Participation Sheet Descriptive Table

<table>
<thead>
<tr>
<th>Total # of groups observed = 807</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of groups agreeing to participate</td>
<td>60</td>
<td>480</td>
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<tr>
<td>Group size:</td>
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</tr>
<tr>
<td>2</td>
<td>48</td>
<td>390</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
<td>197</td>
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<tr>
<td>4</td>
<td>16</td>
<td>114</td>
</tr>
<tr>
<td>5+</td>
<td>12</td>
<td>84</td>
</tr>
<tr>
<td>Group composition:</td>
<td></td>
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</tr>
<tr>
<td>All male</td>
<td>43</td>
<td>263</td>
</tr>
<tr>
<td>All female</td>
<td>23</td>
<td>136</td>
</tr>
<tr>
<td>Mixed</td>
<td>34</td>
<td>201</td>
</tr>
<tr>
<td>DD use:</td>
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<td></td>
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<tr>
<td>Groups reporting a DD</td>
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<td>404</td>
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<tr>
<td>Groups reporting no DD</td>
<td>12</td>
<td>97</td>
</tr>
<tr>
<td>Groups not using a vehicle</td>
<td>37</td>
<td>311</td>
</tr>
<tr>
<td>Number of individuals agreeing to interview/BAC</td>
<td></td>
<td>457</td>
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Appendix F

Designated Driver Questionnaire Descriptive Table
Table 2
Designated Driver Descriptive Table

Total number of individuals agreeing to interview/BAC = 457

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<tr>
<th>Demographics</th>
<th>%</th>
<th>N (participants)</th>
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<td><strong>Gender:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>70</td>
<td>321</td>
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</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>136</td>
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<td><strong>Age:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-20</td>
<td>27</td>
<td>128</td>
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</tr>
<tr>
<td>21-29</td>
<td>71</td>
<td>328</td>
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<tr>
<td>30+</td>
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<tr>
<td><strong>Mean age</strong></td>
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</tr>
<tr>
<td><strong>Class standing:</strong></td>
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<td></td>
</tr>
<tr>
<td>Freshmen</td>
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<td>22</td>
<td></td>
</tr>
<tr>
<td>Sophomore</td>
<td>14</td>
<td>58</td>
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<tr>
<td>Junior</td>
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<tr>
<td>Senior</td>
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<tr>
<td>Graduate</td>
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<tr>
<td><strong>Questions:</strong></td>
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</tr>
<tr>
<td># of male DDs</td>
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<td>46</td>
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<tr>
<td># of female DDs</td>
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<tr>
<td>DD determined before</td>
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<td>DD determine after</td>
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<td>Alcohol was a factor in DD decision</td>
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<td>Alcohol was not a factor in DD decision</td>
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<tr>
<td># times men served as DDs past 30 days</td>
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</tr>
<tr>
<td># times women served as DDs past 30 days</td>
<td>2</td>
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<tr>
<td># times men used DDs past 30 days</td>
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<td># times women used DDs past 30 days</td>
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<tr>
<td># times men consumed 5+ drinks, 30 days</td>
<td>6</td>
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<tr>
<td># times women consumed 4+ drinks, 30 days</td>
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</tr>
<tr>
<td>Mean # drinks consumed by men</td>
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<tr>
<td>Mean # drinks consumed by women</td>
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<tr>
<td>Men, self-estimated level of intoxication</td>
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<tr>
<td>Women, self-estimated level of intoxication</td>
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Appendix G

ANOVA Table
# Gender X Driver Type ANOVA Table

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<td>Driver Type</td>
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<td>12.70</td>
<td>.001</td>
</tr>
<tr>
<td>Gender x Driver Type</td>
<td>1</td>
<td>4.85</td>
<td>.029</td>
</tr>
<tr>
<td>Total</td>
<td>257</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H

Chi Square Frequency Table
Group Size and DD Use

<table>
<thead>
<tr>
<th>Group Comparisons</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 vs. 3</td>
<td>1.12</td>
<td>1</td>
<td>.290</td>
</tr>
<tr>
<td>2 vs. 4</td>
<td>2.51</td>
<td>1</td>
<td>.113</td>
</tr>
<tr>
<td>2 vs. 5</td>
<td>4.79</td>
<td>1</td>
<td>.029*</td>
</tr>
<tr>
<td>3 vs. 4</td>
<td>5.29</td>
<td>1</td>
<td>.021*</td>
</tr>
<tr>
<td>3 vs. 5</td>
<td>7.82</td>
<td>1</td>
<td>.005*</td>
</tr>
<tr>
<td>4 vs. 5</td>
<td>.595</td>
<td>1</td>
<td>.441</td>
</tr>
</tbody>
</table>

* = significant.
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EDUCATION

- **Virginia Polytechnic Institute & State University**  
  Blacksburg, VA 24061  
  Masters of Science in Psychology  
  Graduation Date: May, 1999

- **Lander University**  
  Greenwood, SC  
  Bachelor of Science in Psychology  
  Graduation Date: May, 1997, Magna Cum Laude

- **Piedmont Technical College**  
  Greenwood, SC 29648  
  Associates Degree in Human Services  
  Graduation Date: December, 1994, Honors (GPA: 4.0)  
  Associates Degree in Marketing  
  Graduation Date: August, 1985

EXPERIENCE

1/1998 - present: **Graduate Research Assistant** - Center for Applied Behavior Systems  
**Description:** Alcohol intervention/prevention research assistant and project coordinator, SPSS, SAS data analysis, grant-writing assistant.

**Principal Investigator:** Dr. Albert Prestrude, Virginia Polytechnic Institute & State University  
**Description:** Secondary investigator, field research coordinator.
12/1994 - 8/1997: **Mental Health Technician** - Self Memorial Hospital, Greenwood, SC
*Description*: Substance abuse/psychological counseling, general patient care.

*Description*: Client assessment, group facilitator, DWIs/Pre-trial intervention.

*Description*: Counselor, ScIP (School Intervention Program), high school students with behavioral concerns.

**RESEARCH & GRANT ASSISTANCE EXPERIENCE**

1/99 – 5/99:
*Implementation and Evaluation of a Designated Driver Program in the Blacksburg Community.*
Research supported by Anheuser-Busch, Corporation ($5,000)
Grant co-authors: Kent Glindemann, Ph.D., & Mary Ann Timmerman

1/99 – 5/99:
*Evaluation of Sobriety Checkpoints as a Deterrent for Driving Under the Influence.*
Research supported by Virginia Department of Motor Vehicles ($25,000)
Principal Investigator: E. Scott Geller, Ph.D.
Secondary Investigators: Kent Glindemann, Ph.D., & Mary Ann Timmerman

1/98 - present:
*Evaluation of Prevention Interventions Designed to Decrease Alcohol Abuse and Resulting Negative Outcomes: A Field Study*
National Institute of Alcohol Abuse & Alcoholism ($540,000)
Alcohol Beverage Medical Research Foundation ($40,000)
Principal Investigator: E. Scott Geller, Ph.D.


PROFESSIONAL AFFILIATIONS

• Graduate Affiliate - American Psychological Association
• Board Member - Greenwood County Mental Health Association, 1994 - 1997
• Psi Chi National Honor Society for Psychology, 1995 - 1997
• Alpha Chi National Honor Society, 1996 - 1997
• Psi Beta National Honor Society for Psychology, Vice-President, 1993 - 1995
• Lander University Psychology Club, President, 1996 - 1997

HONORS & AWARDS

• Who’s Who in Junior Colleges, 1994
• County Bank Scholarship, 1994 recipient
• Self Memorial Hospital Auxiliary Scholarship, 1995 & 1996, 2-time recipient
• Psi Chi Research Award, 1997
• Outstanding Student Award - Lander University Behavioral Science Division, 1997
• 1st Place - South Carolina Psychological Association Psychology Bowl, 1996
• Deans List, 1992 - 1997

COMMUNITY INVOLVEMENT

Volunteer, Alcohol & Drug Counseling

- Leathe Correctional Facility, 1993 – present
- Department of Juvenile Justice - Greenwood County, Summer, 1998

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