Reducing DUI Among College Students: Results of an Environmental Prevention Trial

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Background
Driving under the influence (DUI) of alcohol remains one of the most serious public health problems in the United States¹. For college students, DUI is both common² and deadly³. Despite this, the prevention and research communities have done little to address DUI in college settings⁴.

In national studies using random-sampling designs, the prevalence of DUI (past year) reported by college students ranged from 26.5 to 27.8%. Hingson and associates³ noted that, in the 2000 National Household Survey of Drug Abuse, 18- to 24-year-olds not in college reported lower rates of DUI (19.8%) than their collegiate counterparts. Using data from the national surveys, Hingson et al. also estimated that, nationally, more than 1,100 college students died in alcohol-related motor vehicle accidents in 1998.

Despite the lack of DUI prevention efforts targeting college students, environmental DUI prevention campaigns have worked in community settings⁵. Of particular note, for instance, the Community Trials Project⁵ used a model of increased enforcement of DUI laws supported by media advocacy to reduce alcohol-related accidents. Conceptually, the combination of media coverage/campaigns and DUI checkpoints result in increased perceptions of the risk of arrest for DUI in the general population, which, in turn, leads to reduced DUI and accident rates. Underlying this approach is the deterrence model. As noted by H.L. Ross⁶ in one of the seminal works on DUI, general deterrence can be conceptualized as:

“...the effect of threatened punishment upon the population in general, influencing potential violators to refrain from a prohibited act through a desire to avoid the legal consequences.” (p. 8)

Ross noted that general deterrence targets both those who have engaged in the illicit behavior and those who have not (potential cases). General deterrence has short-term effects and long-term effects. Short-term effects are behavioral changes or restraints based on fear of consequences. Long-term effects are a function of aggregate short-term effects and include development of social and moral norms and habits that prohibit the illicit behavior⁶.
Objectives
In the present study we evaluated the extent to which a college DUI prevention intervention that included a social marketing and law enforcement campaign increased students’ perceived risk of DUI ticket or arrest and reduced their occurrences of self-reported DUI.

Methodology

**Design:** To test the efficacy of our campaign, we employed a nonequivalent control group pretest/posttest design. Two large public universities located in the southwestern United States participated in the study. The baseline period began in spring semester of 2000 and ended in December 2001. The intervention began in the spring semester of 2002 and ran through the spring semester of 2003. The beginning on the intervention period coincided with the start of our social marketing campaign.

**Intervention:** During the baseline period, campus police officers at each university conducted standard DUI enforcement (i.e., pulling over suspected drunk drivers) as part of the regular duties and no special DUI enforcement was present at either school. During this period, there was one DUI checkpoint conducted near the experimental campus. This checkpoint was operated by the local city police and was not part of the present project. There no Dui-related media campaigns during the baseline period at either university. During the intervention period, standard DUI enforcement continued at the comparison university. At the experimental university, there was a marked increase in enforcement coupled with a media campaign. The prevention campaign featured DUI checkpoints, media coverage, and a student-designed social marketing campaign aimed at increasing students’ perceptions of risk of arrest for DUI.

**DUI Checkpoints:** DUI checkpoints were operated by the campus police with assistance from the local city police and the highway patrol. Checkpoints were conducted on three main streets surrounding the campus. These streets were selected because they had a significant amount of student foot traffic and motor vehicle traffic. On average, 730 cars were stopped at each checkpoint. The primary goal of the checkpoints was to increase the perception of risk of arrest for DUI. Arrests were a secondary goal. As such, the checkpoints included 10 and 15 officers, several police cars with their lights turned on, cones, flares, and large spotlights. On average, each DUI checkpoint cost $3000 (US) to conduct.

**Media Coverage:** For each checkpoint, the local media (including the campus paper) were contacted. The checkpoints all received coverage on local television news broadcasts. During the intervention period the campus newspaper ran six stories related to DUI. One of these stories (early spring 2003) focused directly on increased enforcement. It is important to note that during the baseline period, eleven DUI-related stories. Like any community-based prevention effort using media advocacy, the success of placing stories related to the issue is predicated on several factors. In this case, the campus newspaper, an independent student-managed paper, changed editorial staff each year. This made consistently placing stories during the intervention period difficult.

**Social Marketing Campaign:** Over the course of the entire prevention effort, we disseminated the following social marketing materials: advertisements in the school newspaper (n=32), posting of ads in public areas on campus (n=500), posting of (n=100) 12”x12” magnets embossed with the ad around campus, and distribution of ads (n=1500) on 4”x5” promotion cards (these cards are similar to those used by bars and clubs to advertise on campus).
Marketing materials were distributed each week. Media materials cost approximately $5000.00 (US) to produce.

**Site Characteristics**
The control campus is somewhat smaller than the experimental campus, but the gender distributions at the two universities are similar. Freshmen and sophomores make up a larger portion of the control campus’s undergraduates than they do at the experimental campus. Alternatively, the graduate departments are roughly proportional to the size of the university. Asian Americans comprise a larger portion of the experimental campus’s population, and Latinos comprise a larger portion of control campus’s population. Each university is slightly less than 60% White. The universities are similar in that they both have small Greek-system communities. This means that this group, which has been found to be at high risk for alcohol problems\(^7\), will play a negligible role in the current study. A larger portion of the student body lives on campus at the control site than at the experimental site. Both sites have campus newspapers that accept alcohol advertisements.

**Telephone Interviews**
Data were collected at each university, each semester during the study. A university-based social science research laboratory conducted telephone interviews with respondents. Trained interviewers conducted the interviews, which were randomly monitored by professional research staff to ensure data quality.

Each semester of the study, 400 students were randomly from registration records at each of the two universities. Students refusing to participate were randomly replaced. Cooperation rates by school and semester are presented in the appendix. For both schools, a sample of 400 students allowed for 95.0% confidence with a +/-5% margin of error when estimating population parameters.

The samples at the two universities were comparable. At the experimental university, 1,613 pre-intervention participants were recruited. Of these, 42.7% were male, and the median age was 22. During the post-intervention period, data were collected from 1,206 participants. Men represented 41.4% of this sample, and the median age again was 22. At the comparison university, 1,610 participants were recruited pretest, and 1,208 were recruited posttest. Men represented 46.6% and 47.2% of the two samples, respectively, and the median age in both was 22.

*Interview:* An original interview schedule was developed for this study. The instrument included several items from the Core Survey\(^7\), including measures of alcohol and other drugs (AOD) use and related problems. In addition to the standard questions taken from the Core Survey, quantity-frequency-variability items developed by Gruenewald and Nephew\(^8\) were included along with several demographic items.

The primary outcome measure for the study was the following survey item: Within the past year, have you driven a vehicle while being under the influence of alcohol? In addition, during the last two semesters of data collection, we asked participants to indicate their perceived risk of being ticketed or arrested for DUI within a 1-mile radius of campus. This was measured using a 5-point scale ranging from Very Unlikely to Very Likely.
Analysis Plan
First, we used logistic regression to predict the outcome measures (driving under the influence, and riding with a driver who was under the influence, in the past 12 months) from campus variable (experimental vs. comparison), intervention period variable (pretest vs. posttest), and the interaction between those two factors. In addition, the analyses included participant sex, age, fraternity/sorority status, and two measures of alcohol consumption: (1) the number of days in the last 28 days that they had at least 1 alcoholic drink, and (2) the maximum number of drinks consumed on any one day during the last 28 days. Both measures were adapted from work by Gruenewald and Nephew. The logistic regression was conducted in a stepwise fashion, with covariates entered in the first step, and the school and intervention variables entered in the second step.

Second, analysis of variance (ANOVA) was used to examine change in perceived risk of DUI arrest from the fall 2002 semester to the spring 2003 semester at the experimental university relative to the comparison university. Although both semesters fall within the posttest period, DUI checkpoints and significant media coverage occurred in early spring 2003. This analysis examined change in perception of DUI risk attributable to those intervention activities. Unfortunately, data on the perceived risk of DUI arrest was not collected throughout the study, so it cannot be used as a mediator of the change in the self-reported drinking-and-driving rate.

Results
Analysis on driving after drinking revealed a statistically significant interaction between campus and intervention, \( \text{Wald (1)} = 9.35, \ p < .01 \). The results reveal a considerable drop in self-reported driving after drinking following the DUI prevention campaign tested at the intervention campus. However, no similar drop was found at the comparison university.

Each of the covariates (gender, age, fraternity status, drinking frequency, and maximum consumption quantity) independently and significantly predicted self-reported driving after drinking. Men were more likely than women to have driven after drinking during the past year, \( \text{Wald (1)} = 13.85, \ p < .01 \), odds ratio = 1.30, and the likelihood of driving after drinking decreased as age increased, \( \text{Wald (1)} = 44.30, \ p < .01 \), odds ratio = .97. Individuals belonging to a fraternity or sorority were more likely to have driven after drinking, \( \text{Wald (1)} = 10.98, \ p < .01 \), odds ratio = 1.52. Finally, both greater drinking frequency [\( \text{Wald (1)} = 370.49, \ p < .01 \), odds ratios = 1.13] and greater consumption per occasion [\( \text{Wald (1)} = 23.47, \ p < .01 \), odds ratios = 1.02], increased the likelihood of reporting driving after drinking.

Analysis of perceived risk for DUI arrest revealed a statistically significant interaction between campus and semester (fall 2002 vs. spring 2003), \( \text{F (1, 1570)} = 3.85, \ p = .05 \). As shown in Figure 3, perceptions of DUI risk increased for students at the experimental university following fall 2002, whereas no change was observed at the comparison university.

Discussion
This study is the first to test the efficacy of an environmental DUI prevention intervention in a college community. As noted earlier, such interventions have been effective in community settings. Given the seriousness of DUI as a public health risk and the prevalence of this behavior within the college student population, the results of this study are encouraging. Several issues, however, should be considered when interpreting our findings. Moreover,
there are several practical considerations related to developing and implementing such campaigns.

Regarding our research design, a few limitations must be considered. First, we were only able to use one self-report measure of DUI. Ideally, we would have validated this measure with roadside BAC surveys. Unfortunately, such surveys were beyond the resources of the project.

Second, because the data used to evaluate the campaign were drawn from an ongoing study, we were unable to conduct a true pretest of our mediator variable, perceptions of risk of arrest. The findings related to perceptions of risk of arrest for DUI, however, are consistent with the conceptual model presented earlier.

This study was limited to two universities located in somewhat different geographic areas. One university is in a larger urban setting, whereas the other is in a smaller urban area surrounded by a rural community. Despite the geographic differences, the schools are comparable in terms of drinking rates. Further, both universities are within a 40-minute drive to the U.S./Mexico border, a risk factor for heavy drinking and DUI\(^9\). Although this unique socio-geographic setting is considerably different than most U.S. universities, it is arguably a more difficult setting in which to intervene. As such, the results of this study are even more encouraging.

Conclusions & Future Steps
Environmental DUI prevention has been effective in community settings and appears to have promise in college settings. Future studies are needed to test environmental DUI prevention campaigns across different college settings. Such studies should include both public and private universities. Ideally, future studies would measure perception of risk of DUI arrest using a true predesign/postdesign. Roadside blood alcohol concentration surveys would also greatly enhance future studies.

References