A Study of the Relationship Between Protective Behaviors and Drinking Consequences Among Undergraduate College Students

Jorge Delva, PhD; Michael P. Smith, MA; Richard L. Howell, MS; Dianne F. Harrison, PhD; Dina Wilke, PhD; D. Lynn Jackson, MSW

Abstract. The authors identified the number, type, and frequency of protective behaviors that undergraduate college students who consume alcohol use to prevent alcohol-related consequences. Their hypothesis was that students who engage in more types of protective behaviors with greater frequency would be less likely to experience alcohol-related consequences. Participants consisted of a randomly selected sample of 1,355 undergraduates aged 18 years and older at a large public university. Students completed a mailed questionnaire on alcohol and health behaviors in spring 2002. The findings (after adjustment for covariates) indicated that self-protective behaviors are inversely associated with alcohol-related problems for women but not for men. The influences of gender and racial and ethnic differences are considered in relation to prevention and intervention programs aimed at reducing alcohol-related consequences on college campuses.

Key Words: alcohol use, college drinking, heavy drinking, protective factors

Alcohol use and misuse have been documented in a number of college-specific surveys, including the College Alcohol Study (CAS), the Center for Alcohol and other Drug Studies (CORE), the National College Health Assessment, and others, as well as in population-based surveys such as Monitoring the Future and the National Household Survey of Drug Abuse. Findings from these surveys provide substantial evidence that alcohol consumption is prevalent among college students and that many students experience a plethora of academic, psychosocial, and health consequences, some of which are fatal. Although considerable attention has been given to identifying high-risk drinking groups and risk factors among college students, scant attention has been paid to identifying the protective behaviors in which students engage to prevent or minimize alcohol-related harm.

As a result of the widespread prevalence of alcohol-related problems among college students, the 1990s witnessed the emergence of interventions such as social norms, motivational, and comprehensive multifaceted programs. Our purpose in conducting this study was to (1) identify the types of protective behaviors in which students engage when they consume alcohol, (2) describe the frequency with which students rely on these behaviors to prevent alcohol-related harm when they consume alcohol, and (3) determine whether students who report these protective behaviors are less likely to experience alcohol-related harm compared with students who do not report such behaviors.

METHOD

Sample

We based this study on cross-sectional data collected in spring 2002 from a random sample of undergraduate students attending a large public university. The university's institutional review board approved of the study before we began the survey. The questionnaire, which used items from the National College Health Assessment Survey (NCHA), was administered to a random sample of 4,485 undergraduate students aged 18 years and older; we received responses from 1,355 students, a return rate of 31%.
Survey Administration

A multidisciplinary team of researchers who followed Dillman’s survey principles to increase respondents’ participation administered the survey to a randomly selected sample of students whose names and addresses were obtained from the university’s registrar’s office. We used EGRET software to conduct power analyses to obtain a sample size that would provide sufficient power to perform statistical analyses and to provide a representative sample of the undergraduate student population. We sent a letter to 4,485 students informing them they had been randomly selected to participate in a survey of health behaviors, indicating that the questionnaire would be mailed within a week, and encouraging them to ask the principal investigator (MPS) any questions they had about the study. A week later, we mailed the questionnaires and consent forms to the students.

We designed the survey process to assure students that their answers were confidential, but we also tracked the respondents so that we could award 10 cash prizes of $50 for their participation. The questionnaires were stored in a locked file cabinet in the office of the principal investigator.

Questionnaire

The 7-page, self-administered questionnaire included items concerning alcohol, tobacco, and other drug use; perceptions of the use of these substances among the general student body; questions about alcohol-related injury, sexual behaviors, health-promotion, and health-seeking behaviors; academic performance; and demographic characteristics.

Measures

Alcohol-Related Problems

We used a composite score of 7 alcohol-related problems as a measure of this variable. Students were asked the following question, “If you drink alcohol, during the last school year, have you experienced any of the following as a consequence of your drinking?” The list consisted of the following:

- physically injured yourself
- physically injured another person
- been involved in a fight
- done something you later regretted
- forgot where you were or what you did
- had someone use force or threaten force to have sex with you
- had unprotected sex?

Response categories were always (5), usually (4), sometimes (3), rarely (2), and never (1). The internal consistency of the items was 0.79.

Separate bivariate analyses for men and women indicated that among women, each of these protective behaviors was inversely correlated with each of the alcohol-related problems listed earlier. Although magnitudes of some of the correlations were low, they were still significant (data not shown). Among men, however, the behavior item “have a friend to let you know when you’ve had enough” was not significantly correlated with any of the potential problems students were asked about. To examine whether protective behaviors, cumulatively and in a multivariate context, were linked to alcohol-related problems, we created composite scores, using all 10 protective behavior items for women and the 9 significant items for men. The internal consistency was 0.80 among women and 0.74 among men.

To facilitate interpretation of results and because of the skewed nature of the data, we divided and ranked the skewed distribution of the data, we dichotomized the alcohol-problems scale into a no problem/any one-problem category, allowing us to determine the odds of students’ alcohol problems as a function of the extent of the protective behaviors they used.

Alcohol Consumption

To measure the variable alcohol consumption, we asked the students, “Think back over the last 2 weeks. How many times, if any, have you had 5 or more alcoholic drinks at a sitting?” Response categories consisted of a continuous scale ranging from none to 9 or more times. This variable served as a statistical control in our multivariate analyses.

Self-Protective Behaviors

To measure protective behaviors, students were asked, “During the last school year, if you ‘partied’/socialized, how often did you...”

- alternate nonalcoholic with alcoholic beverages
- determine, in advance, not to exceed a set number of drinks
- choose not to drink alcohol
- use a designated driver
- eat before or during drinking
- have a friend to let you know when you’ve had enough
- keep track of how many drinks you were having
- pace your drinks to 1 or fewer per hour
- avoid drinking games
- drink an alcohol look-alike (nonalcoholic beer, punch, etc)?

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• the next quartile, 25%–50% = students with low-to-midlevel scores,
• the next quartile, 50%–75% = students with mid-to-high level scores
• the final quartile, 75%–100% = students with the highest protective-behavior scores

Demographic Characteristics

We obtained data on students’ self-reported gender and racial and ethnic backgrounds (White non-Hispanic, Black non-Hispanic, Hispanic, and Other). We also obtained data on whether students belonged to a fraternity or sorority.

Data Analysis

To conduct bivariate and multivariate analyses, we used Stata 6.0 software. To test whether the occurrence of alcohol-related problems was inversely related to the extent of protective behaviors, we used contingency tables. To test whether the occurrence of alcohol-related problems was inversely associated with the use of protective behaviors, we used multiple logistic regression analysis, simultaneously adjusting statistically for drinking behaviors, age, race, and fraternity or sorority affiliation, with separate analyses for male and female students.

RESULTS

We received responses from 1,355 students and discarded 180 questionnaires because of missing data. Of the 1,175 remaining participants, 132 had never used alcohol. Thus, we conducted the inferential analyses on 1,043 undergraduate college students who indicated they had consumed alcohol at least once in the past 12 months. Nearly 5% of the respondents were aged 18 years, about 16% were 19 years old, 23% were 20 years old, and 56% were aged 21 years or older. Women represented 68% of the sample and the racial and ethnic backgrounds of most of the respondents (81.5%) were White non-Hispanic; 8.6% of the sample were Black non-Hispanic, and 5.8% were Hispanic. The characteristics of the participants did not differ from those of the larger population of undergraduate students in the university, except that we undersampled men and 18-year-olds.

Nearly 55% of the female participants who used alcohol said they had experienced at least 1 alcohol-related problem in the past 12 months. The most commonly reported problems were doing something they later regretted (43.2%), forgetting where they were or what they did (37.6%), physically injuring themselves (24.1%), having unprotected sex (21.2%), and experiencing academic problems (13.0%).

The self-protective behaviors that the women reported they “usually” or “always” practiced when they partied or socialized included using a designated driver (74.6%), eating before or during drinking (74.3%), keeping track of the number of drinks (65.4%), and avoiding drinking games (39.6%). Drinking alcohol look-alikes was the protective behavior they used least. Approximately 23% of the students reported having consumed 5 or more alcoholic drinks at a sitting on 1 or 2 occasions during the 2-week period before the survey; 20% said they consumed that amount of alcohol on 3 or more occasions during the same period.

Among the male students, 64.4% reported having experienced at least 1 problem attributable to alcohol use in the past 12 months. The most commonly reported problems were doing something they later regretted (48.7%), forgetting where they were or what they did (38.6%), having unprotected sex (25.4%), physically injuring themselves (23.5%), and experiencing academic problems (17.1%).

The self-protective behaviors that men reported they “usually” or “always” practiced when they partied or socialized included eating before or during drinking (70.7%), using a designated driver (63.9%), keeping track of the number of drinks they consumed (55.8%), and avoiding drinking games (37.9%). The protective behaviors the men used least included drinking alcohol look-alikes, choosing not to drink alcohol, alternating nonalcoholic with alcoholic beverages, and pacing their drinks to 1 or fewer per hour. About 29% of the students reported they had consumed 5 or more alcoholic drinks at a sitting once or twice during the 2-week period before the survey. Nearly 33% indicated that they had consumed that amount of alcohol 3 or more times during the same period.

The data in Figures 1 and 2 show a dose-response between the extent of protective behaviors and the percentages of students who experienced alcohol-related problems for female and male students, respectively. The percentage of students who experienced an alcohol-related problem was significantly higher among those with the fewest protective behaviors (lowest quartiles), compared with those with the most protective behaviors (2 highest quartiles) for both female and male students.

The multivariate analysis indicated that women in the lowest quartile (low-to-mid-levels of protective behaviors) were about 6.5 times more likely to experience alcohol-related problems (95% confidence interval [CI] = 3.6–12.0) than were women with the highest levels of such behaviors (highest quartile, 95% CI = 3.9–11.5). We calculated these odds after statistically adjusting for the number of times students had 5 or more alcoholic drinks over a 2-week period preceding the survey (see Table 1, model 1).

By contrast, the odds of experiencing alcohol-related problems among women with mid-to-low levels of protective behaviors were 3.1 (95% CI = 1.8–5.2) times higher than those among the women with the greatest number of protective behaviors (see Table 1, model 1). When we included adjustments for age, race, and Greek membership in the model, the magnitude of the associations did not change (see Table 1, model 2). An additional significant finding was that African American women were less likely than were White women to experience alcohol-related problems.

For male students, the differences in problematic drinking by extent of protective behaviors shown in Figure 2 ceased to exist in the multivariate analyses. Specifically, the odds ratios (ORs) for experiencing alcohol-related problems among male students in the highest quartile of protective behaviors, compared with those in the lowest quartile...
for protective behaviors, were 1.74 times higher (95% CI = 0.6–4.2). For those men with low- to mid-level protective behaviors, we estimated the odds ratios to be 1.2 times higher (95% CI = 0.5–3.0) than for those in the highest protective levels. Further, we estimated the odds of those with mid to high levels of protective behavior to be 1.5 times higher (95% CI = 0.7–3.4) than for those in the highest protective level (see Table 2, model 1). When we included adjustments for age, race, and Greek membership in the model, the magnitude of the associations did not change (see Table 2, model 2). In both models, heavy alcohol consumption is the only variable that predicted alcohol-related problems among male students.

**COMMENT**

A major finding of our study was that student drinkers who engaged in more types of protective behaviors more frequently were less likely to experience alcohol-related problems. However, we found some important gender differences. We identified a gender difference in the frequency with which students used protective behaviors and in the strength of the association between protective behaviors and alcohol-related problems. A greater proportion of the female students reported relying on self-protective behaviors. The magnitude of the association between protective behaviors and alcohol-related problems was stronger and significant only for female students. Several factors may explain such gender differences. Women, more often than men, are more sensitive to the need for self-protection because of the possible threat of sexual assault, and female students may also socialize more in groups that reinforce norms about protecting each other by using designated drivers, combining eating with drinking, and keeping track of the number of drinks.

In traditional male-gender socialization and norms, men may be less likely to engage in protective behaviors that peers may view as indicating "weakness" or a "lack of masculinity." These gender differences in the use and possible meaning and context of self-protective behaviors deserve further study.

Another key finding was that men and women were equally unlikely to report the following protective behaviors: pacing the number of drinks consumed to 1 or fewer
per hour, drinking alcohol look-alikes, choosing not to drink alcohol, and alternating nonalcoholic with alcoholic beverages. These findings have important implications for prevention; specifically, that interventions should focus on enhancing the behaviors students are most likely to favor. Interventions that target the protective behaviors that students are more likely to use may be more consistent with existing norms and thus more effective for students. At the same time, interventions that involve protective behaviors that students do not currently report using may need to be marketed in ways that are more attractive to students and focus on changing students’ norms and acceptability. Furthermore, health educators should more aggressively target interventions that focus on the amount of alcohol men consume as a way of reducing their alcohol-related problems.

In addition to the gender differences we describe, we observed interesting racial and ethnic differences. Although the number of non-White men in our survey was too small for us to conduct reliable analyses, we found that female African American students were more likely to abstain from alcohol than were White and Hispanic women, which is consistent with reports from other research. The women who consumed alcohol were likely to keep track of the amount of alcohol they consumed, avoid drinking games, eat before or during drinking, and plan not to exceed a set amount of alcohol. The greater prevalence of protective behaviors that African American female students adopt could serve as a guide for prevention programs across all racial and ethnic groups. Recent studies suggest that strong religious orientations among African American youth serve as a critical protective factor. The extent to which religious beliefs are a protective factor among African American women who attend college remains to be investigated.

African American women also report more conservative drinking norms than their White counterparts. However, research studies have shown that whereas African American women have a higher prevalence of abstention than White women, those who do drink report more heavy-drinking episodes. Future research should seek to identify the pathways and mechanisms that distinguish between African American women who abstain from consuming alcohol,
those who consume alcohol infrequently and in limited quantities, and those who go on to consume alcohol in harmful ways. One recent study found that exposure to discrimination had a direct influence on problem drinking among African Americans.42

Our findings in this study and other findings in earlier studies15 indicate that drinking patterns are similar between Hispanic and White non-Hispanic women. In addition, we found that these groups do not differ in the types of protective behaviors they use. Understanding the risks and protective factors of these racial and ethnic populations highlights the need for further research, particularly in view of the increasing numbers of residents and college students with Hispanic backgrounds in the United States.43

We found that Greek membership was not significantly associated with reports of alcohol-related problems. However, the CIs for these associations for both men and women suggest that the ORs for these effects might have been significant had we had a larger sample as has been evident in previous research.8,14

Limitations

Readers should consider these findings in the context of the following 3 important study limitations.

The cross-sectional design. The temporal association between protective behaviors and alcohol-related problems cannot be identified. Students who experience more alcohol-related problems may be less likely to engage in self-protective behaviors. Longitudinal research is needed to understand the direction of this association and any causal mechanism. We hope to be able to provide some answers to these questions in subsequent waves of data collection.

The low response rate. Despite our efforts to obtain more responses, only 31% of the surveyed students participated; as a result, men and 18-year-olds were underrepresented. Although this response rate falls within the range of most studies of single-institution college populations that used mailed surveys44 and is higher than others,45 it is possible that nonresponses may have introduced some bias. However, the rates of alcohol use reported in this study are comparable to those of other national college substance-abuse surveys.44,46 Those studies did not find that rates of alcohol use varied according to the participation rates of students. A positive aspect of the study sample is that we obtained a very good representation of female undergraduates that enabled us to uncover some interesting associations among women.

The small number of non-White male participants. Although we identified a number of protective mechanisms among African American women, we were not able to conduct the same analyses with men.

### TABLE 1. Results of Logistic Regression Analyses Predicting Whether Female Respondents Experienced Alcohol-Related Problems in the Preceding 12 Months, by Levels of Self-Protective Behaviors and Correlates

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model 1 (n = 626)</th>
<th>Model 2 (n = 605)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>Protective behaviors, by quartiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest (Q1)</td>
<td>6.5 (3.6–12.0)</td>
<td>6.4 (3.4–11.9)</td>
</tr>
<tr>
<td>Low-mid (Q2)</td>
<td>6.7 (3.9–11.5)</td>
<td>6.6 (3.8–11.5)</td>
</tr>
<tr>
<td>Mid-low (Q3)</td>
<td>3.1 (1.8–5.2)</td>
<td>3.2 (1.8–5.6)</td>
</tr>
<tr>
<td>Highest (Q4)</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Number of times had ≥ 5 drinks in past 2 wk</td>
<td>2.0 (1.6–2.4)</td>
<td>1.9 (1.5–2.3)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>0.9 (0.8–1.0)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.5 (0.2–0.9)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.2 (0.5–2.7)</td>
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</tr>
<tr>
<td>Other</td>
<td>0.5 (0.2–1.5)</td>
<td></td>
</tr>
<tr>
<td>Sorority</td>
<td>No</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1.2 (0.7–2.0)</td>
</tr>
<tr>
<td>–2 log likelihood</td>
<td>621.55</td>
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<tr>
<td>( \chi^2 )</td>
<td>224.65**</td>
<td>222.44**</td>
</tr>
<tr>
<td>( df )</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

Note. OR = odds ratio; CI = 95% confidence interval; \( df \) = degrees of freedom. CIs that do not capture the null (1.0) indicate ORs that are significant at *\( p < .05 \). **\( p < .001 \).
PROTECTIVE BEHAVIORS

Conclusions

In conclusion, the findings that we report point to a number of areas that can be targets of interventions and areas that need further research. The Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism has suggested that increased research is needed to determine whether multicomponent interventions that encourage students to drink less and engage in more protective behaviors lead to fewer alcohol-related problems than interventions that emphasize only one prevention component. Additional research is also needed to understand the patterns and protective behaviors of minority students to identify interventions that are sensitive to racial and ethnic norms and the social context of students’ drinking.

ACKNOWLEDGMENT

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NOTE

For comments and further information, please address correspondence to Jorge Delva, PhD, assistant professor, University of Michigan School of Social Work, 1080 S. University, Ann Arbor, MI 48109 (e-mail: jdelva@umich.edu).

REFERENCES


TABLE 2. Results of Logistic Regression Analyses Predicting Whether Male Respondents Experienced Alcohol-Related Problems in the Preceding 12 Months, by Levels of Self-Protective Behaviors and Correlates

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model 1 (n = 304)</th>
<th>Model 2 (n = 292)</th>
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<tbody>
<tr>
<td>Levels of protective behaviors,</td>
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<td></td>
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<tr>
<td>by quartiles</td>
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<tr>
<td>Lowest (Q1)</td>
<td>1.7 (0.7-4.1)</td>
<td>1.7 (0.6-4.2)</td>
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<tr>
<td>Low-mid (Q2)</td>
<td>1.3 (0.6-3.1)</td>
<td>1.2 (0.5-3.0)</td>
</tr>
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<td>Mid-low (Q3)</td>
<td>1.5 (0.7-3.0)</td>
<td>1.5 (0.7-3.4)</td>
</tr>
<tr>
<td>Highest (Q4)</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Number of times had ≥ 5 drinks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in past 2 wk</td>
<td>2.3 (1.8-3.0)</td>
<td>2.5 (1.8-3.4)</td>
</tr>
<tr>
<td>Age</td>
<td>0.8 (0.6-1.1)</td>
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<tr>
<td>Race</td>
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<td></td>
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<td>White</td>
<td>Reference</td>
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<tr>
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<tr>
<td>Hispanic</td>
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<td></td>
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<tr>
<td>Other</td>
<td>1.1 (0.6-3.5)</td>
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</tr>
<tr>
<td>Fraternity</td>
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<tr>
<td>No</td>
<td>Reference</td>
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<tr>
<td>Yes</td>
<td>1.4 (0.6-3.5)</td>
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<tr>
<td>-2 log likelihood</td>
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<tr>
<td>(\chi^2)</td>
<td>96.68**</td>
<td>112.88</td>
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<tr>
<td>df</td>
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</tbody>
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†Sample size too insufficient to estimate.
**p < .001.


