

Misperceiving the College Drinking Norm and Related Problems: A Nationwide Study of Exposure to Prevention Information, Perceived Norms and Student Alcohol Misuse

H. WESLEY PERKINS, PH.D.,[†] MICHAEL P. HAINES, M.S.,[†] AND RICHARD RICE, M.A.[†]

Department of Anthropology and Sociology, Hobart and William Smith Colleges, Geneva, New York 14456

ABSTRACT. Objective: This study examined (1) the prevalence of misperceptions of college student drinking norms across campuses nationwide, (2) the importance of perceived norms in predicting high-risk drinking, (3) the association of exposure to alcohol education information with students' perceptions of campus drinking norms and (4) the differences in high-risk drinking rates between schools where exposure to alcohol information is associated with more accurately perceived norms and schools where exposure to information is unrelated to perceptions or is associated with greater misperceptions. **Method:** Multivariate analyses were used to analyze an aggregate database of the National College Health Assessment survey administered to 76,145 students from 130 colleges and universities nationwide from spring 2000 through spring 2003. **Results:** Regardless of the actual campus drinking norm, a consistently large percentage of students nationwide over-

estimated the quantity of alcohol consumed by their peers. Students' perception of their campus drinking norm was the strongest predictor of the amount of alcohol personally consumed in comparison with the influence of all demographic variables. Perception of the norm was also a much stronger predictor when compared with the actual campus norm. Reduced levels of high-risk drinking and negative consequences were found among students attending the relatively few schools where exposure to prevention information was associated with less exaggerated perceptions of the drinking norm compared with students attending other schools. **Conclusions:** Misperceived drinking norms are a pervasive problem. Schools that do not seek to reduce these misperceptions with their prevention information are neglecting a potentially powerful component of prevention. (*J. Stud. Alcohol* 66: 470-478, 2005)

A NUMBER OF LONGITUDINAL STUDIES have consistently reported that the majority of college students consume alcohol (Johnston et al., 2002; Wechsler et al., 2002), and other research has consistently identified a wide range of negative consequences affecting a sizeable minority of college student drinkers and those around them (Perkins, 2002a). Consequently, colleges and universities have developed and implemented a wide array of prevention programs, including forms of alcohol education, counseling services, alternative alcohol-free activities and policy restrictions (Anderson and Milgram, 2001; Wechsler et al., 2000). Unfortunately, there is little evidence to suggest that prevention efforts overall have significantly reduced problematic alcohol consumption among college students nationwide during the last decade (Johnston et al., 2002; Wechsler et al., 2002).

One explanation for the persistence of heavy episodic alcohol use focuses on the pervasiveness of misperceptions of drinking norms as a key factor contributing to heavy use that occurs in college populations. The initial research in this area revealed a consistent pattern of misperceptions

whereby students typically thought that the norms for both the frequency and the amount of drinking among their peers were higher than was actually the case, and they generally believed that their peers were more permissive in their personal attitudes about substance use than was, in fact, the case. Reducing these misperceptions, it was suggested, might reduce heavy drinking and its related harm (Berkowitz and Perkins, 1986; Perkins and Berkowitz, 1986).

The misperception of drinking norms among college students has been now documented in more than 25 studies conducted on multiple campuses and with a variety of measures (see Berkowitz [2005] and Perkins [2002b, 2003a] for reviews of this literature). Moreover, research using a nationwide database drawn from 100 colleges and universities has documented that college students typically misperceive their peer norms by substantially overestimating how frequently the average student uses a variety of substances, including alcohol (Perkins et al., 1999). Only one study has argued that college students do not misperceive the level of drinking by their peers (Wechsler and Kuo, 2000). However, a critique of this study noted that its discrepant finding was the result of employing a measure for the perception of peer consumption that was fundamentally different from the measure employed to assess actual personal consumption (DeJong, 2003).

Much research investigating drinking norm misperceptions and their effect on problem drinking among students

Received: November 5, 2004. Revision: March 17, 2005.

[†]Correspondence may be sent to H. Wesley Perkins at the above address, or via email at: perkins@hws.edu. Michael P. Haines and Richard Rice are with the National Social Norms Resource Center, Northern Illinois University, DeKalb, IL.

has emerged in recent years, as have interventions to reduce these misperceptions. Interventions using a "social norms" or "normative feedback" approach have resulted in significant reductions in heavy episodic alcohol consumption and its related harm at a number of demographically diverse institutions throughout the country (Fabiano, 2003; Foss et al., 2001; Haines and Spear, 1996; Jeffrey et al., 2003; Johannessen et al., 1999; Perkins and Craig, 2002). In addition, a number of effective social norms programs have targeted specific subpopulations (e.g., first-year students, residence hall residents, fraternity and sorority members and athletes) within the campus environment by employing media campaigns (Mattern and Neighbors, 2004), peer-based programming efforts (Cimini et al., 2002), computer-delivered normative feedback (Neighbors et al., 2004) and workshop or counseling formats to reduce misperceptions and problem drinking (Barnett et al., 1996; Borsari and Carey, 2000; Steffian, 1999). Successful social norms experiments have also been conducted with students identified as heavy drinkers (Agostinelli et al., 1995; Collins et al., 2002; Cunningham et al., 2001; Neighbors et al., 2004) as well as students living in small residential groupings (Schroeder and Prentice, 1998). It has been noted that, although some of these interventions have had methodological limitations (Werch et al., 2000), the similar pattern of positive results reported at many diverse schools implementing this approach is compelling, especially when compared with longitudinal data revealing a concurrent lack of improvement at the national level overall (DeJong, 2002; DeJong and Linkenbach, 1999).

In contrast, a few studies report ineffective social norms interventions. However, most of these studies did not reduce misperceptions (Granfield, 2002; Thombs et al., 2004; Werch et al., 2000), a result that social norms theory posits should yield no change in the personal drinking levels (Perkins, 1997). Thus, the failure of these interventions represents no fundamental criticism of the social norms model (Thombs et al., 2004). Unsuccessful interventions may reflect insufficient intensity, duration or credibility of messages needed to reduce misperceptions or an overly narrow focus on a target group without reducing misperceptions of the broad student population (Perkins, 2003b).

One study did find a change in perceptions after a brief social norms campaign, but described the impact on personal behavior as a failure (Clapp et al., 2003). The study compared before-and-after samples drawn from one campus residence hall in which the message that most students drink between zero and four drinks at parties was disseminated for 6 weeks with a control sample from another residence hall. Students exposed to the campaign subsequently perceived significantly less amounts being consumed at parties, but failed to demonstrate a statistically significant reduction in the amounts consumed while increasing their days of drinking in the last 28 days, relative to the control

group. Although the increase in days was certainly not the desired effect, it is important to point out that there were no messages in the campaign about the norms for the frequency of use. Moreover, the total number of drinks in the past 28 days stayed exactly the same for the experimental group, who had significantly increased the times drinking, thus suggesting that students were spreading out their consumption with fewer drinks per occasion in the last month. In contrast, whereas the control group reduced their number of days drinking in the last 28 days, the reported total drinks on average for that group increased from 35 to 42, suggesting that in the last 4 weeks their amount per occasion was rising. Thus, success or failure here is equivocal and a matter of interpretation. In contrast, another recent study of campus residence hall residents evaluated the impact of a brief social norms marketing campaign using multiple messages about the norms for frequency and quantity of alcohol use and employing a panel design for data collection (Mattern and Neighbors, 2004). This study was able to demonstrate a link at the individual level between the reduction in misperceived norms and the reduction in personal drinking achieved over the course of the intervention period.

One study using a national database and claiming to evaluate social norms marketing interventions found no positive effect overall on the reduction of student misuse among schools identified as conducting such interventions compared with other schools (Wechsler et al., 2003). However, the classification of schools for comparison was based on only one administrator's response to a single question asking if the school had used a social norms campaign. Although this study did measure students' exposure to prevention information in general, it did not assess students' perceptions of their campus drinking norm and was therefore unable to determine what effect, if any, exposure to a school's information campaign had on students' perceptions. Another nationwide study has shown that the perception of the peer drinking norm, which varies considerably within schools, is a significant predictor of personal alcohol misuse (Perkins and Wechsler, 1996). To date, however, no nationwide study has examined the association of colleges' alcohol education information with students' perceptions of the campus drinking norm and whether greater accuracy in these perceptions that is associated with alcohol education information can also be correlated with reduced risk.

The present study was undertaken, using the largest nationwide database of information on college students evaluated to date, to assess the extent of misperceptions among students about peer drinking norms and to examine whether more accurate perceptions correlate with reduced alcohol-related risk. Four crucial questions were examined: (1) How prevalent are the misperceptions of college drinking norms across campuses nationwide? (2) How important are perceived

drinking norms in predicting high-risk drinking when simultaneously controlling for the effect of actual norms? (3) What association does the perception of campus drinking norms have with the prevention information students receive? and (4) Do schools where prevention information is associated with less misperception of the campus drinking norm have lower levels of alcohol-related risk among their students?

Method

This study is an analysis of a nationwide database, the National College Health Assessment (NCHA), which has been administered on college campuses across the United States since 2000. Developed in 1998 by a working group of the American College Health Association, the NCHA survey incorporates questions used in several existing campus surveys and covers a wide range of health issues. Of particular interest for this study were questions regarding exposure to college health education information, personal alcohol use and perceptions of peer drinking norms, negative consequences of use, impediments to academic performance and demographics. A complete copy of the survey is available elsewhere (American College Health Association, 2004), as is a report of the instrument's reliability and validity (American College Health Association, 2001).

Sample

Data for this study were drawn from the NCHA survey aggregate data collected from spring 2000 through spring 2003. Only data from institutions that reported using random sampling methods were included. For those institutions that administered the NCHA in multiple years, only the last iteration was used. In addition, only data from institutions that obtained a sample size of at least 100 students were analyzed. This resulted in a database of 76,145 respondents from 130 colleges and universities throughout the United States, including 32 schools from the Northeast, 38 from the Midwest, 32 from the South and 28 from the West.

Measures

Several questions from the NCHA survey were used in this study. First, regarding personal alcohol use, respondents were asked, "The last time you 'partied'/socialized, how many alcoholic drinks did you have? State your best estimate." In this survey, one drink was explicitly defined as "a 12 oz beer, a 4 oz glass of wine, a shot of liquor or a mixed drink." Response options ranged from 0 to 99. The small number of respondents who reported consuming more than 25 drinks per occasion ($n = 339$ or 0.4% of the database) were deemed unreliable and were excluded, along

with the 1.7% of students who did not respond to this question. Students were also asked how many hours they had spent drinking on this occasion so that (with information about gender and body weight) their estimated peak blood alcohol concentration (BAC) could be calculated. Regarding the perceived norm, students were asked, "How many alcoholic drinks do you think the typical student at your school had the last time he/she 'partied'/socialized?" Again, possible responses ranged from 0 to 99; responses over 25 ($n = 318$ or 0.4%) were excluded, along with the 4% of respondents giving no response.

Second, students were asked, "On which of the following health topics have you ever received information from your college or university?" Twelve response options ranged from "Tobacco use prevention" to "Physical activity and fitness" and including "Alcohol and other drug use prevention." The final response option provided was "None of the above." Respondents who did not mark any of the response options to this question, including "None of the above," and the small number who selected one or more of the responses *and also* selected the response "None of the above" were excluded from analyses using this question ($n = 2,482$ or 3.3% of the database).

Third, students were asked, "If you drink alcohol, within the last school year, have you experienced any of the following as a consequence of your drinking?" Consequences assessed in the survey included the following: physically injured yourself; physically injured another person; been involved in a fight; forgot where you were or what you did; had someone use force or the threat of force to have sex with you; and had unprotected sex. Respondents who indicated experiencing any of these consequences were coded as having a negative consequence as a result of drinking.

Finally, students were asked, "Within the last school year, have any of the following affected your academic performance?" Alcohol use was one of the measures considered. The response options were (1) This did not happen to me/inapplicable; (2) I have experienced this issue but my academics have not been affected; (3) Received a lower grade on an exam or important project; (4) Received a lower grade in the course; and (5) Received an incomplete or dropped the course. Respondents who selected response 3, 4 or 5 with regard to alcohol use were coded as having had alcohol use negatively affect their academic performance.

Results

First, we examined the prevalence of misperceptions of campus drinking norms and the extent to which these misperceptions could be found within various individual campus contexts exhibiting differing actual norms. The actual drinking norm for each of the 130 schools represented in the database was estimated by computing the median

number of drinks respondents reported consuming the last time they had "partied"/socialized. The distribution of schools by their actual norms is reported in Table 1. Drinking norms ranged from abstaining (four schools) to seven drinks (one school). It was most common to find school norms in the middle range, with a median of three (35 schools) or four drinks (38 schools).

Table 1 also reports the distribution of respondents' perceptions of the drinking norm at their school (i.e., estimates of the amount the typical student at their school consumed the last time they "partied"/socialized) compared with what was actually the case. At schools where abstaining was the norm, only 20.6% of students accurately perceived that the typical student at their school did not drink. By contrast, almost four out of five (79.4%) students at these schools overestimated the drinking norms by perceiving that the typical student drank at least one drink, and almost three out of five (59.9%) thought it was most common among their school peers to consume three or more drinks.

This pattern of grossly overestimating the norm was found regardless of the actual school norm. For example, at schools where the norm was four drinks, only 3.1% of the respondents underestimated the norm by three or more drinks (i.e., thinking it typical for students to have one drink or none), and only 12.3% underestimated the norm by one or two drinks. Another 12.6% respondents held accurate perceptions. By contrast, 37.0% of respondents at schools where the norm was four drinks overestimated by one or two drinks (i.e., thinking it was five or six), and an additional 34.9% believed that students typically consumed seven or more, thus overestimating the norm by three or more. Even at the single school with the highest norm, perception far outpaced reality, with 61.4% of the respondents overestimating the norm. Considering the entire sample of over 70,000 students, 15.2% underestimated the norm at their school, 13.8% accurately identified the norm and 71.0% overestimated the norm. Thus, exaggerated

misperceptions of the norm were clearly most common at all schools.

Next, we examined the potential impact of perceived norms by looking at how well respondents' perceptions of the norm for students at their school predicted their own consumption levels the last time they "partied"/socialized. We wished to examine how influential perceived norms might be on personal behavior when controlling for and comparing the relative effects of demographic variables commonly associated with alcohol use in student populations. Furthermore, we wanted to examine the effect of perceived norms independent of and in comparison with the influence of the actual campus norm.

To assess these simultaneous effects, a multivariate regression analysis was conducted on the number of drinks personally consumed the last time respondents "partied"/socialized as the dependent variable. The student's perception of drinks consumed by the typical student at his or her school the last time "partied"/socialized was entered as an independent variable along with the median number of drinks reported for personal behavior at the respondent's school representing the actual norm. Gender, age, year in school, race (categories entered as a series of dummy variables with white serving as the comparison group), fraternity/sorority membership, hours per week working for pay and volunteering and region (dummy variables with South being the comparison category) were also included to predict personal drinking. All of the independent variables were entered simultaneously in the regression model.

Table 2 presents the results of this multivariate regression analysis. First, the unstandardized coefficients show that, independent of the actual norm, each one-drink increase in a student's perception of the campus norm predicted almost a one-half drink (0.48) increase in personal consumption. In comparison, a one-drink increase in the actual school norm predicted approximately a one-third (0.37) drink increase in personal consumption, controlling for demographic variation nationwide.

TABLE 1. Students' accuracy in perceiving the drinking norm at their school (comparing actual with perceived number of alcoholic drinks consumed the last time students "partied"/socialized)

Actual school norm (median drinks)	Accuracy of perceived drinking norm					Total	N of respondents	N of schools
	Underestimate of ≥ 3 drinks (%)	Underestimate of 1-2 drinks (%)	Accurate estimate (%)	Overestimate of 1-2 drinks (%)	Overestimate of ≥ 3 drinks (%)			
0	NA	NA	20.6	19.5	59.9	=100%	1,891	4
1	NA	10.5	3.8	28.5	57.2	=100%	2,526	6
2	NA	7.5	8.1	30.6	53.7	=100%	8,345	14
3	3.8	6.4	13.5	37.5	38.7	=100%	18,859	35
4	3.1	12.3	12.6	37.0	34.9	=100%	20,353	38
5	4.3	15.8	20.6	24.1	35.3	=100%	11,481	20
6	6.9	23.2	15.0	23.5	31.5	=100%	8,912	12
7	5.7	23.3	9.7	23.6	37.8	=100%	352	1
Total schools	3.4	11.8	13.8	31.9	39.1	=100%	72,719	130

The effects of almost all variables in Table 2, even those with a small impact, were statistically significant, given the extremely large sample size. Only American Indian/Alaskan Native versus white, full-time versus part-time student status, hours working for pay and West versus South did not produce a significant result. More important, however, is the relative strength of effect for each variable in explaining variation in personal consumption as revealed by comparing the standardized coefficients. This comparison shows that the perceived norm is by far the strongest predictor of personal drinking in these data ($\beta = .33$), with gender the second most powerful predictor ($\beta = .24$). The fact that gender is a strong predictor is expected, given that male students are consistently found to consume substantially more alcohol than female students (Berkowitz and Perkins, 1987; Wechsler et al., 2002). Of particular note here is that the perceived norm is a more powerful predictor than gender and that it is a *dramatically* stronger predictor of personal drinking compared with the (albeit) significant effects of other factors frequently noted, such as race and fraternity/sorority membership. Also notable is that the actual campus drinking norm, which shows the third largest effect of all the independent variables entered in the regression equation ($\beta = .12$), pales in comparison with the ability of the perceived norm to account for variation in personal drinking levels.

We next examined the extent to which campus prevention program information could be linked to students' per-

TABLE 2. Unstandardized and standardized regression coefficients predicting number of alcoholic drinks consumed last time "partied"/socialized

Independent variables	Unstandardized coefficient (B)	Standardized coefficient (β)
Perception of how many alcoholic drinks are consumed by the typical student at one's school the last time they "partied"/socialized	0.48	.33
Actual norm (median) for number of alcoholic drinks consumed last time students at one's school "partied"/socialized	0.37	.12
Gender (male vs female)	2.18	.24
Age	-0.05	-.06
Year in school	0.08	.03
Race		
Black vs white	-1.63	-.09
Hispanic/Latino vs white	-0.45	-.03
Asian/Pacific Islander vs white	-1.27	-.08
American Indian/Alaskan Native vs white	-0.19	-.00 ^a
Other vs white	-0.57	-.02
Fraternity/sorority member (yes vs no)	1.55	.11
Student status (full time vs part time)	-0.11	-.01 ^a
Hours per week working for pay	0.00	.01 ^a
Hours per week volunteering	-0.05	-.05
School region		
Northeast vs South	0.22	.02
Midwest vs South	0.20	.02
West vs South	0.11	.01 ^a

Notes: ^aCoefficient is not significant, $p > .001$; coefficients for all other independent variables are significant at $p < .001$ (t test of B , $df = 59,184$).

ceptions of campus drinking norms. About half of the respondents nationally (52.0%) indicated that they had received some type of alcohol and other drug use prevention information from their school. The prevalence of exposure among schools ranged from 4.2% to 81.4%. Presumably, the type of information provided by schools varied as well, although no direct measure of content type was available. Nonetheless, we wanted to know whether exposure to prevention information could be linked to less misperception that very heavy drinking was the norm among peers, or conversely, with more problematic misperceptions.

For this analysis, we wanted to examine the prevalence of perceived drinking norms in excess of the actual school norm that represented clearly harmful misperceptions (i.e., misperceptions potentially most detrimental to personal consumption at each school). Therefore, a perception of the peer drinking norm as seven or more drinks at last "party"/socializing was chosen as a particularly harmful misperception that might contribute to an especially high personal drinking level. We examined data from the 129 schools where the actual norm fell between zero and six drinks per occasion (the one school with the norm of seven was excluded from this analysis) so that a perceived norm of seven or more drinks per occasion represented a misperception of the actual norm in each instance. The data from each school were analyzed separately, comparing students who had and had not received prevention information, to determine if there was any difference in the percentage of respondents who misperceived the typical student on their campus as consuming seven drinks or more per occasion. Three categories of schools were established based on whether there was at least a 5-percentage-point difference in misperception rates between students reporting exposure to prevention material and those who did not.

Table 3 presents these categories and the number of schools represented in each group. There were only 10 schools where exposure to prevention information was associated with lowered levels of misperception. At 85 schools (approximately two thirds of the schools in the study), exposure to prevention material was not notably associated with any difference in misperception. Finally, at 34 schools, students who had received prevention information were more likely to overestimate the norm. Thus, the overwhelming majority of schools were either not attempting or not managing to reduce the dramatic misperceptions of campus drinking norms among their students with the information provided.

The final step in our analysis assessed the impact that attending each of the three types of schools had on students' likelihood of engaging in risky or problem drinking at their school. It is important to note that even though rates of exposure to prevention information varied among schools in general, the three categories were not distinguished by their rates of exposure (see Table 3). Thus, any

TABLE 3. Distribution of schools surveyed by association of student exposure to alcohol and other drug use prevention information with extent of misperception of the drinking norm

Relative extent of misperception with information exposure	N of schools	% of students receiving school prevention information
Less misperception among exposed students ^a	10	50.6
No difference between exposed and other students ^b	85	51.5
Greater misperception among exposed students ^c	34	53.2

Notes: ^aAmong students receiving prevention information, the percent misperceiving the norm to be seven or more drinks at parties and social occasions was at least 5% less than that among students who had not received information at the same school; ^bLess than 5% difference in percent of students misperceiving seven or more drinks as the norm at parties and social occasions comparing students who received prevention information and those who did not at the same school; ^cAmong students receiving prevention information, the percent misperceiving the norm to be seven or more drinks at parties and social occasions was at least 5% greater than that among students who had not received information at the same school.

differences in actual problem drinking rates that might be found among the three types of schools would not be attributable simply to differences in the prevalence of exposure to prevention program information. A related initial concern with this comparison of school types could be that some schools might solely target the most high-risk groups with alcohol information so that students at these schools who had received such information might still tend to hold greater misperceptions and exhibit more high-risk drinking themselves, regardless of some positive impact of this information. Importantly, however, half of the students acknowledged having received prevention information in each category noted in Table 3, strongly suggesting that the information was not targeted solely or primarily at problem students or at specific high-risk groups in any one of these three conditions.

We used logistic regression to estimate the odds ratios (ORs) of engaging in five measures of risky or problem drinking for students at schools with programs that do not affect misperceptions and at schools with programs associated with inflated misperceptions compared with the students at schools with programs associated with reduced misperceptions. The logistic regression model also included gender, class year in school, race, fraternity/sorority membership and geographic region as independent variables in the multivariate analysis to control for any spurious influence of these demographic factors.

Table 4 presents the results of these logistic regression analyses. Three dependent variables concentrated on various measures of high risk based on the amount of alcohol consumed, and two dependent variables focused on reported negative consequences of drinking during the last year. For each measure, the odds of engaging in risky consumption

or experiencing a negative consequence are significantly higher among students at schools where program information is not associated with misperceptions compared with students at schools where their information is associated with less misperception. For example, the proportion of students drinking five or more drinks at a sitting in the last 2 weeks in the former group is predicted to be 25% larger than what is predicted for the latter group (OR = 1.25). The proportion of students who reported having alcohol use negatively affect their academic performance during the year in the former group is 44% greater than what is predicted for the latter group (OR = 1.44).

The odds increase further on each measure in Table 4 when students attending schools where program information is associated with greater misperception are compared with students attending schools where program information is associated with less misperception (ORs = 1.55 for consuming five or more drinks at a sitting and 1.55 for alcohol negatively affecting academics). Respondents at schools where program information was linked to greater misperceptions were more than one and one-third times as likely (OR = 1.38) to have an estimated peak BAC level of

TABLE 4. Likelihood of students misusing alcohol at schools where program information exposure is not associated with misperceptions or is associated with greater misperceptions of the drinking norm in comparison with students attending schools where program information exposure is associated with less misperception

Dependent variables	OR ^a comparing students at schools where information is not associated with misperceptions with students at schools where information is associated with less misperception	OR ^a comparing students at schools where information is associated with greater misperceptions with students at schools where information is associated with less misperception
Consumed ≥ 5 drinks at a sitting during the last 2 weeks	1.25 [‡]	1.55 [‡]
Consumed ≥ 7 alcoholic drinks the last time "partied"/socialized	1.18 [†]	1.46 [‡]
Estimated peak BAC level of .08% or higher last time "partied"/socialized	1.14 [†]	1.38 [‡]
Alcohol use negatively affected academic performance during the last year	1.44 [‡]	1.55 [‡]
Experienced other negative consequence as a result of drinking within the last school year ^b	1.15 [†]	1.32 [‡]

Notes: OR = odds ratio; BAC = blood alcohol concentration. ^aORs are reported based on logistic regression controlling for gender, class year in school, race, fraternity/sorority membership and region of school. ^bIncludes physical injury to self or others, fighting, forgot where one was or what they did, had someone use force or threat of force to have sex or had unprotected sex.

[†]Statistically significant at $p < .01$; [‡] $p < .001$.

0.08% or higher for the last time "partying"/socializing compared with students at schools where prevention information is associated with lower misperceptions. Similarly, respondents at schools where program information was linked to greater misperceptions were about one and one-third times more likely ($OR = 1.32$) to experience a negative consequence as a result of drinking, including physical injury to self or others, fighting, forgetting where one was or what one did, had someone use force or threat of force to have sex or having had unprotected sex.

Discussion

Our results, based on the largest national database analyzed to date, suggest that nearly three quarters of college students nationwide overestimate the *amount* of alcohol consumed by their peers at parties and social occasions. Whether the individual campus drinking norm is low, moderate or high, a consistently large percentage of students perceive that the norm is to drink more than is actually being consumed by the majority of their peers. This finding complements previous nationwide research documenting widespread misperception (i.e., overestimation) of the campus norms for the *frequency* of consumption (Perkins et al., 1999). Future research may examine this likely misperception of the norm for amounts consumed in other drinking contexts.

The current study also confirms and extends previous national research demonstrating that perception of the campus drinking norm is a significant predictor of personal alcohol use (Perkins and Wechsler, 1996). Furthermore, our analyses reveal that a student's perception of the campus drinking norm is the strongest predictor of the amount he or she personally consumes in comparison with the influence of all other demographic variables commonly used to predict personal drinking levels.

In addition, the present study contributes an important new finding to the literature. No prior national study has analyzed the influence of students' perception of the campus drinking norm as compared with the influence of the actual campus drinking norm. Our analyses reveal that, although the actual norm is an important predictor of personal consumption, students' perception of the norm is a much more powerful predictor of their drinking behavior than the amount actually consumed by most of their school peers.

Given the overwhelming importance of perception, schools whose alcohol misuse prevention information is associated with less misperception of the campus drinking norms should be effective in reducing their students' alcohol-related risk. The empirical evidence in this study strongly suggests that this is the case. At schools where lower misperceptions of the campus drinking norms were associated with exposure to the school's prevention information, personal high-risk drinking levels and alcohol-re-

lated negative consequences were significantly lower in comparison with schools whose prevention material was not associated with perceived norms. The difference was more pronounced in comparison with schools where exposure to their information was associated with greater misperception.

Unfortunately, the data in this study reveal that the prevention information provided by only a very small percentage (i.e., less than 8%) of schools was associated with students having lower misperceptions of the campus drinking norm. By contrast, the prevention information provided by over 90% of the schools in this study was not associated with lower misperceptions; in fact, exposure to prevention information at 34% of the schools was associated with *greater* misperceptions. Thus, the prevention information provided by over one third of schools in this study was actually associated with students' *increased* risk of alcohol-related harm.

This study must be considered in view of the following limitations. First, the survey data presented here are based on self-reports and are thus subject to the various kinds of error associated with this approach. Nevertheless, a review of the literature reveals that self-report data are generally both reliable and valid (Babor et al., 2000; Cooper et al., 1981; Midanik, 1988). Furthermore, emerging research based on breath analyzer studies (Foss et al., 2001; Thombs, 2003) confirms the findings presented here that students typically perceive that the norms for the amount of drinking among their peers are higher than they actually are. Second, although the data collected by each school were reportedly gathered using a random method, the schools themselves were not randomly selected to participate; rather, their participation was determined by their choice to employ the NCHA survey. Nevertheless, the extremely large number of respondents and the geographic distribution of schools throughout the country strongly suggest that the findings are likely to be representative of students nationwide.

A third limitation is that it is not possible, based on the data, to determine or describe the specific content of the alcohol education information to which students were exposed. Thus, it is not possible to state with certainty what kind of information was associated with either reduced or inflated misperceptions of the campus drinking norms. Conceivably, a variety of message content could affect students' perceptions. Although the only alcohol education strategy referenced in the research literature specifically for its effectiveness in reducing misperceptions of campus drinking norms is the social norms approach, future research is needed to clarify precisely what types of information are most effective in reducing misperceptions.

Taken together, these findings have serious implications for college prevention efforts because they demonstrate the critically important role of students' perceptions of the cam-

pus drinking norm in determining their own behavior. The results of this study strongly suggest that, to reduce students' risk of alcohol-related harm, colleges and universities need to evaluate the impact of their prevention information, attending specifically to its effectiveness in reducing students' misperceptions of campus drinking norms. Clearly, programs that do not address such misperceptions by consistently communicating accurate normative information to students are neglecting a potentially powerful component of prevention. However, those schools seeking to employ the social norms approach should not assume that it is sufficient to conduct a simplistic media campaign, for example, that communicates some kind of information about actual campus drinking norms because the effectiveness of the intervention may be seriously compromised if the normative information is confusing or not interpreted as intended (Thombs et al., 2004) or lacks credibility as the result of a questionable source (Granfield, 2002). The intervention may also be rendered less effective if the "dosage" of normative information is limited in comparison with the forces producing misperceptions, or if, however inadvertently, other prevention initiatives may be simultaneously inflating the very misperceptions that the normative messages are designed to dispel (Perkins, 2003b). Thus, although many schools may be making a nominal attempt to employ the social norms approach, it is critically important to remember that an indispensable measure of the effectiveness of a social norms intervention is the extent to which it reduces harmful misperceptions.

The results of this study suggest that most schools have not attempted to reduce students' misperceptions of campus drinking norms or that they have not been successful in achieving such reductions. Nevertheless, these nationwide results also provide strong empirical support for the previous findings of numerous other studies in specific school settings (Perkins, 2003a) demonstrating that when schools do achieve reductions in misperceptions, the effect is a significant decline in students' high-risk drinking and its negative consequences.

Acknowledgment

The authors thank the American College Health Association for providing survey data from schools participating in the National College Health Assessment and Victor Leino, in particular, for his work in assembling the aggregate database for our use. The authors also thank Gregory Barker of Northern Illinois University for his comments and other contributions to this research.

References

AGOSTINELLI, G., BROWN, J.M. AND MILLER, W.R. Effects of normative feedback on consumption among heavy drinking students. *J. Drug Educ.* **25**: 31-40, 1995.

AMERICAN COLLEGE HEALTH ASSOCIATION. National College Health Assessment: ACHA-NCHA Reliability and Validity Analyses, Baltimore, MD: American College Health Association, 2001.

AMERICAN COLLEGE HEALTH ASSOCIATION. National College Health Assessment (available at: http://www.acha.org/projects_programs/assessment.cfm), accessed September 22, 2004.

ANDERSON, D.S. AND MILGRAM, G.G. Promising Practices: Campus Alcohol Strategies, Fairfax, VA: George Mason University, 2001.

BABOR, T.F., STEINBERG, K., ANTON, R. AND DEL BOCA, F. Talk is cheap: Measuring drinking outcomes in clinical trials. *J. Stud. Alcohol* **61**: 55-63, 2000.

BARNETT, L.A., FAR, J.M., MAUSS, A.L. AND MILLER, J.A. Changing perceptions of peer norms as a drinking reduction program for college students. *J. Alcohol Drug Educ.* **41** (2): 39-62, 1996.

BERKOWITZ, A.D. An overview of the social norms approach. In: LEDERMAN, L.C. AND STEWART, L.P. (Eds.) *Changing the Culture of College Drinking: A Socially Situated Health Communication Campaign*, Cresskill, NJ: Hampton Press, 2005, pp. 193-214.

BERKOWITZ, A.D. AND PERKINS, H.W. Resident advisers as role models: A comparison of drinking patterns of resident advisers and their peers. *J. Coll. Student Person.* **27**: 146-153, 1986.

BERKOWITZ, A.D. AND PERKINS, H.W. Recent research on gender differences in collegiate alcohol use. *J. Amer. Coll. Hlth* **36**: 123-129, 1987.

BORSARI, B. AND CAREY, K.B. Effects of a brief motivational intervention with college student drinkers. *J. Cons. Clin. Psychol.* **68**: 728-733, 2000.

CIMINI, M.D., PAGE, J.C. AND TRUJILLO, D. Using peer theater to deliver social norms information: The middle earth players program. *The Report on Social Norms: Working Paper No. 8*, **2** (1): 1-7, 2002.

CLAPP, J.D., LANGE, J.E., RUSSELL, C., SHILLINGTON, A. AND VOAS, R.B. A failed social norms marketing campaign. *J. Stud. Alcohol* **64**: 409-414, 2003.

COLLINS, S.E., CAREY, K.B. AND SLIWINSKY, M.J. Mailed personalized normative feedback as a brief intervention for at-risk college drinkers. *J. Stud. Alcohol* **63**: 559-567, 2002.

COOPER, A.M., SOBELL, M.B., SOBELL, L.C. AND MAISTO, S.A. Validity of alcoholics self-reports: Duration data. *Int. J. Addict.* **16**: 401-406, 1981.

CUNNINGHAM, J.A., WILD, T.C., BONDY, S.J. AND LIN, E. Impact of normative feedback on problem drinkers: A small-area population study. *J. Stud. Alcohol.* **62**: 228-233, 2001.

DEJONG, W. The role of mass media campaigns in reducing high-risk drinking among college students. *J. Stud. Alcohol, Supplement No. 14*, pp. 182-192, 2002.

DEJONG, W. Report to the Field: The Case of the Missing Misperception, HECNews (Online News Service) October 13, Washington, DC: Higher Education Center for Alcohol and Other Drug Prevention, Department of Education, 2003.

DEJONG, W. AND LINKENBACH, J. Telling it like it is: Using social norms marketing campaigns to reduce student drinking. *Amer. Assoc. Higher Educ. Bull.* **52**: 11-16, 1999.

FABIANO, P.M. Applying the social norms model to universal and indicated alcohol interventions at Western Washington University. In: PERKINS, H.W. (Ed.) *The Social Norms Approach To Preventing School And College Age Substance Abuse: A Handbook For Educators, Counselors, and Clinicians*, San Francisco, CA: Jossey-Bass, 2003, pp. 83-99.

FOSS, R.D., MARCHETTI, L.J. AND HOLLADAY, K.A. Development and Evaluation of a Comprehensive Program to Reduce Drinking and Impaired Driving Among College Students, National Highway Traffic Safety Administration, Report No. DOT HS 809 396, Washington, DC: Department of Transportation, 2001.

GRANFIELD, R. Can you believe it? Assessing the credibility of a social norms campaign. *Rep. Social Norms* **2**: 1-8, 2002.

HAINES, M. AND SPEAR, S.F. Changing the perception of the norm: A strategy to decrease binge drinking among college students. *J. Amer. Coll. Hlth* **45**: 134-140, 1996.

JEFFREY, L.R., NEGRO, P., MILLER, D.S. AND FRISONE, J.D. The Rowan University Social Norms Project. In: PERKINS, H.W. (Ed.) *The Social Norms Approach To Preventing School and College Age Substance Abuse: A*

- Handbook For Educators, Counselors, and Clinicians, San Francisco, CA: Jossey-Bass, 2003, pp. 100-110.
- JOHANNESEN, K., COLLINS, C., MILLS-NOVOA, B. AND GLIDER, P. A Practical Case Study in Implementing Social Norms and Environmental Management Approaches, Tucson, AZ: University of Arizona, 1999.
- JOHNSTON, L.D., O'MALLEY, P.M. AND BACHMAN, J.G. Monitoring the Future: National Survey Results on Drug Use, 1975-2001, Vol. 2, NIH Publication No. 02-5107, Bethesda, MD: Department of Health and Human Services, 2002.
- MATTERN, J.L. AND NEIGHBORS, C. Social norms campaigns: Examining the relationship between changes in perceived norms and changes in drinking levels. *J. Stud. Alcohol* **65**: 489-493, 2004.
- MIDANIK, L.T. Validity of self-reported alcohol use: A literature review and assessment. *Brit. J. Addict.* **83**: 1019-1030, 1988.
- NEIGHBORS, C., LARIMER, M.E. AND LEWIS, M.A. Targeting misperceptions of descriptive drinking norms: Efficacy of a computer-delivered personalized normative feedback intervention. *J. Cons. Clin. Psychol.* **72**: 434-447, 2004.
- PERKINS, H.W. College student misperceptions of alcohol and other drug norms among peers: Exploring causes, consequences and implications for prevention programs. In: *Designing Alcohol and Other Drug Prevention Programs in Higher Education: Bringing Theory into Practice*, Newton, MA: Higher Education Center for Alcohol and Other Drug Prevention, Department of Education, 1997, pp. 177-206.
- PERKINS, H.W. Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *J. Stud. Alcohol*, Supplement No. 14, pp. 91-100, 2002a.
- PERKINS, H.W. Social norms and the prevention of alcohol misuse in collegiate contexts. *J. Stud. Alcohol*, Supplement No. 14, pp. 164-172, 2002b.
- PERKINS, H.W. (Ed.) *The Social Norms Approach To Preventing School and College Age Substance Abuse: A Handbook For Educators, Counselors, and Clinicians*, San Francisco, CA: Jossey-Bass, 2003a.
- PERKINS, H.W. The promise and challenge of future work using the social norms model. In: PERKINS, H.W. (Ed.) *The Social Norms Approach To Preventing School and College Age Substance Abuse: A Handbook For Educators, Counselors, and Clinicians*, San Francisco, CA: Jossey-Bass, 2003b, pp. 280-296.
- PERKINS, H.W. AND BERKOWITZ, A.D. Perceiving the community norms of alcohol use among students: Some research implications for campus alcohol education programming. *Int. J. Addict.* **21**: 961-976, 1986.
- PERKINS, H.W. AND CRAIG, D.W. *Multifaceted Social Norms Approach to Reduce High-Risk Drinking: Lessons from Hobart and William Smith Colleges*, Newton, MA: Higher Education Center for Alcohol and Other Drug Prevention, Department of Education, 2002.
- PERKINS, H.W., MEILMAN, P.W., LEICHLITER, J.S., CASHIN, J.R. AND PRESLEY, C.A. Misperceptions of the norms for the frequency of alcohol and other drug use on college campuses. *J. Amer. Coll. Hlth* **47**: 253-258, 1999.
- PERKINS, H.W. AND WECHSLER, H. Variation in perceived college drinking norms and its impact on alcohol abuse: A nationwide study. *J. Drug Issues* **26**: 961-974, 1996.
- SCHROEDER, C.M. AND PRENTICE, D.A. Exposing pluralistic ignorance to reduce alcohol use among college students. *J. Appl. Social Psychol.* **28**: 2150-2180, 1998.
- STEFFIAN, G. Correction of normative misperceptions: An alcohol abuse prevention program. *J. Drug Educ.* **29**: 115-138, 1999.
- THOMBS, D.L., DOTTERE, R.S., OLDS, R.S., SHARP, K.E. AND RAUB, C.G. A close look at why one social norms campaign did not reduce student drinking. *J. Amer. Coll. Hlth* **53**: 61-68, 2004.
- THOMBS, D.L., OLDS, R.S. AND SNYDER, B.M. Field assessment of BAC data to study late-night college drinking. *J. Stud. Alcohol* **64**: 322-330, 2003.
- WECHSLER, H., KELLEY, K., WEITZMAN, E.R., SAN GIOVANNI, J.P. AND SEIBRING, M. What colleges are doing about student binge drinking: A survey of college administrators. *J. Amer. Coll. Hlth* **48**: 219-226, 2000.
- WECHSLER, H. AND KUO, M. College students define binge drinking and estimate its prevalence: Results of a national survey. *J. Amer. Coll. Hlth* **49**: 57-64, 2000.
- WECHSLER, H., LEE, J.E., KUO, M., SEIBRING, M., NELSON, T.F. AND LEE, H. Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 Harvard School of Public Health College Alcohol Study Surveys: 1993-2001. *J. Amer. Coll. Hlth* **50**: 203-217, 2002.
- WECHSLER, H., NELSON, T.F., LEE, J.E., SEIBRING, M., LEWIS, C. AND KEELING, R.P. Perception and reality: A national evaluation of social norms marketing interventions to reduce college students' heavy alcohol use. *J. Stud. Alcohol* **64**: 484-494, 2003.
- WERCH, C.E., PAPPAS, D.M., CARLSON, J.M., DICLEMENTE, C.C., CHALLY, P.S. AND SINDER, J.A. Results of a social norm intervention to prevent binge drinking among first-year residential college students. *J. Amer. Coll. Hlth* **49**: 85-92, 2000.