

# College Factors That Influence Drinking

CHERYL A. PRESLEY, PH.D., PHILIP W. MEILMAN, PH.D.,<sup>†</sup> AND JAMI S. LEICHLITER, PH.D.<sup>†</sup>

*Student Health Programs, Southern Illinois University, Carbondale, Illinois*

**ABSTRACT.** *Objective:* The purpose of this article is to examine the aspects of collegiate environments, rather than student characteristics, that influence drinking. Unfortunately, the existing literature is scant on this topic. *Method:* A literature review of articles primarily published within the last 10 years, along with some earlier “landmark” studies of collegiate drinking in the United States, was conducted to determine institutional factors that influence the consumption of alcohol. In addition, a demonstration analysis of Core Alcohol and Drug Survey research findings was conducted to further elucidate the issues. *Results:* Several factors have been shown to relate to drinking: (1) organizational property variables of campuses, including affiliations (historically black institutions, women’s institutions), presence of a Greek system, athletics

and 2- or 4-year designation; (2) physical and behavioral property variables of campuses, including type of residence, institution size, location and quantity of heavy episodic drinking; and (3) campus community property variables, including pricing and availability and outlet density. Studies, however, tend to look at individual variables one at a time rather than in combination (multivariate analyses). Some new analyses, using Core Alcohol and Drug Survey data sets, are presented as examples of promising approaches to future research. *Conclusions:* Given the complexities of campus environments, it continues to be a challenge to the field to firmly establish the most compelling institutional and environmental factors relating to high-risk collegiate drinking. (*J. Stud. Alcohol*, Supplement No. 14: 82-90, 2002)

IT HAS BEEN almost 50 years since Straus and Bacon (1953) first reported that alcohol on college campuses presented problems to college and university administrators. More recently, in 1989, a survey found that more than 67% of college presidents rated alcohol misuse to be a “moderate” or “major” problem on their campuses (Carnegie Foundation for the Advancement of Teaching, 1990). More to the point, college presidents described alcohol misuse as the single greatest threat to the quality of campus life. This concern has not diminished since the passage of the Drug Free Schools and Communities Act of 1986 and its Amendments of 1989, as evidenced by media reports that have inundated the public of sexual assaults, campus violence, personal injury and deaths where alcohol was cited as a factor in the incidents.

Researchers report that approximately 44% of full-time students at 4-year institutions engage in “binge” or heavy episodic drinking patterns (Wechsler et al., 1994) as do 45.6% of full- and part-time students at 2- and 4-year institutions (Presley et al., 1998). In addition, the Monitoring the Future Study (Johnston et al., 1998a) reported that there have been some notable increases in illicit drug use among American junior and senior high school students since 1992. Many of these students will attend college within a few years and will bring these difficulties with them.

For years, one response that college and university officials offered regarding drinking on campus was that alcohol use and even misuse was a developmental rite of passage for students and that, if left alone, these students would pass through these stages of involvement with alcohol without great injury or harm (Jessor and Jessor, 1975). More recently, institutions of higher education have focused on education and intervention strategies oriented to individual students (Wallack and DeJong, 1995). This response has reflected the view that those who experience problems do so because of some genetic or characterological deficit, and if ignorance were removed about the effects and dangers of alcohol use or the enforcement of laws and policies, problematic alcohol use would diminish. But, as former deputy drug czar Herbert Kleber stated so clearly, “Education is the cure to the extent that ignorance is the disease” (personal communication, 1989). Here we are more than 10 years later, and we have not “cured” the problem, despite numerous educational programs.

“There is still a great deal to be learned about university campus culture as it interacts with demographic and personality variables to influence the use and abuse of alcohol,” Brennan et al. (1986, p. 490) asserted. In their research, Shore et al. (1983) also surmised that campus factors can affect drinking habits of college students. They found that resistance to peer pressure to drink and the desire to refrain from drinking were more intensely related to college environmental variables than to personal background variables. Moos (1976) found that although many individuals can resist environmental influences, some collegiate environments are powerful enough to influence almost everyone. Shore

<sup>†</sup>Philip W. Meilman is with Counseling and Psychological Services, Gannett: Cornell University Health Services, Ho Plaza, Ithaca, NY 14853-3101. Correspondence should be sent to him at that address or via email to pwm7@cornell.edu. Jami S. Leichliter is with the Centers for Disease Control and Prevention, Atlanta, GA.

et al. (1983) suggested that the recognition that campus life is isolated or in some way insulated from the “real world” has been one of the most important factors in focusing on immediate environmental variables over earlier developmental influences such as religious orientation or parents’ drinking habits. This focus is consistent with the Core Survey finding that almost one-fifth of students in college report taking their first drink after reaching age 18 (Presley et al., 1996a).

The relationship between environment and behavior is complex; adding to this complexity, collegiate environments can no longer be typified as a single culture nor can students be described as homogeneously as in years past (Upcraft, 1999). More nontraditional students are attending college, and the percentage of ethnic minority students is steadily increasing (National Center for Education Statistics, 1994). In addition, there is a growing recognition that what constitutes a campus environment can be difficult to describe. The boundaries of this environment have become less clear because of the increasing recognition that students receive their communications and messages from a vast number of sources and multiple competing interests. Distance learning, nearby but “off-campus” housing, the local business environment adjacent to campus and the Internet all blur the outlines of where the campus environment begins and ends. DeJong et al. (1998) asserted that there were at least five institutional and community factors that constitute the environment of college for today’s student. Astin (1993) and Pascarella and Terenzini (1991) identified more than 200 “environmental” or factor variables that have varying degrees of influence on individual college students. Many of these factors have been studied independently as well as in relationship to each other.

Although no one conceptual model exists that links college environmental factors with individual student characteristics, the scope of this article is to identify and present relevant moderating environmental variables that have been shown to impact on individual student behavior with regard to alcohol use and misuse. For organizational purposes, this article presents three categories under which many of the environmental variables of concern can be subsumed: physical property variables, organizational property variables and campus/community variables.

In this article, we (1) review and synthesize what is currently known about collegiate environmental factors that impact on the quality of academic life and that influence alcohol use and misuse and (2) identify methodological and research limitations of existing literature and make recommendations for future directions. We do so with the following assumptions:

- Individuals are not passive members of the university or college community. The university campus culture interacts with

personality and experiential variables to influence the use and misuse of alcohol.

- The conditions that influence alcohol in the campus environment can be thought of as deriving from a number of properties of campuses, and each of these categories of variables has an impact on student behaviors.
- The categories are not mutually exclusive. Prevention efforts directed to decrease risk for alcohol misuse and illicit substance use and to enhance protective factors must be based on an understanding of how the categories of variables interact with each other.

## Method

Reviewed in this chapter are articles primarily published within the last 10 years, although some earlier “landmark” studies are also cited. The studies are limited to colleges and universities in the United States but include both 2- and 4-year institutions. Although the focus is on high quality multi-institutional studies using random and representative samples, single college studies are included if they add significantly to an understanding of the research question at hand or point to new research directions. Studies include those that are more descriptive in nature as well as some that have employed more sophisticated analyses. Some new types of analyses, using Core Alcohol and Drug Survey data sets, are presented as examples of promising approaches to future research.

## Results

Variables germane to this discussion are organized into the following categories: (1) organizational property variables of campuses, including affiliations (historically black institutions, women’s institutions), presence of a Greek system, athletics and 2- or 4-year designation; (2) physical and behavioral property variables of campuses, including type of residence, institution size, location and quantity of high-risk/heavy episodic drinking; and (3) campus community property variables, including pricing and availability and outlet density.

### *Organizational property variables of campuses*

*Historically black colleges and other racial/ethnic findings.* After reviewing various outcomes of those who attend predominantly black or single-gender institutions, Pascarella and Terenzini (1991) found that attendance at a predominantly black institution is not associated with any educational disadvantage. To the contrary, they found that some of the benefits included “larger increases in certain areas of cognitive development, brighter prospects for completing a baccalaureate degree program, and indirectly, the higher post-college earning associated with degree completion” (p. 638).

In two multicollege studies, Meilman et al. (1994, 1995) found that black students were much less likely to indulge in alcohol and high-risk/heavy episodic drinking practices than were white students. In addition, they experienced far fewer damaging consequences of heavy drinking. Although the first published article investigated the differences in drinking habits of more than 40,000 college students, it did not answer the question regarding the drinking habits of black students at historically black institutions and black students at predominantly white institutions. An additional related question for the second article was whether the drinking habits of white students at historically black institutions differed from that of white students at predominantly white institutions. The methodology for the second study entailed a matched sample that included 12,351 students—6,222 at 14 historically black institutions and 6,129 at 14 predominantly white institutions. The second analysis, which corroborated the earlier research findings of distinct ethnic differences in the use of alcohol among college students, found that those differences asserted themselves regardless of institutional setting and that drinking and high-risk/heavy episodic drinking levels at historically black institutions were significantly lower than at predominantly white institutions.

Additional studies using Core Survey findings have shown that Native American/Alaska Native students and white students use the most alcohol, black and Asian students use the least and Latino/Latina students are in a middle range (Presley et al., 1993a, 1995, 1996a,b).

Thus, research supports the view that there are institutional factors based on race that may enhance or reduce excessive alcohol use. Predominantly white institutions will show more problematic alcohol use, and historically black institutions will show less.

*Women's colleges.* Similarly, Pascarella and Terenzini (1991) reported that attendance at single-gender institutions provided educational benefits "less likely on coeducational campuses. These findings held constant even with student background characteristics and institutional selectivity held constant" (p. 638). Consistent with this report, it is not surprising that additional research has found the following with regard to alcohol use on these types of campuses.

Although many studies indicated that women generally consume less alcohol, engage in high-risk/heavy episodic drinking episodes less frequently and experience fewer negative consequences than men in institutions of higher education (Engs and Hanson, 1985; Presley et al., 1993a, 1995, 1996a,b; Wechsler et al. 1994), the first study to examine the prevalence of women's drinking and the correlates of women's drinking at women's colleges was Wechsler et al. (1995). This study of 508 women found that women at women's colleges engaged in high-risk drinking (defined as four or more drinks in a row in the previous 2 weeks) less frequently and had fewer alcohol-related problems than women at coeducational institutions.

In a data analysis of six women's colleges conducted for this article with a sample size of 1,311 students, the Core Institute found that heavy episodic drinking (defined as five or more drinks in a row in the previous 2 weeks) on these campuses ranged from a low of 23% of the women to a high of 42%, with a mean of 32%. The percentage of women who were classified as frequent drinkers (three or more times per week) ranged from 5.6% to 20.9%.

By way of comparison, overall data for women in 1992-1994 (Presley et al., 1996a) indicated that 14.0% of the women at the 89 colleges surveyed were frequent drinkers (three or more times per week), with 30.7% of the women reporting episodes of heavy episodic drinking within the previous 2 weeks. Therefore, the aggregated numbers for women do not look very different from those of the six women's colleges. However, Core Survey data on women from 1997 from a further analysis of data from Presley et al. (1998) show a frequent drinking rate of 17.4% and a heavy episodic drinking rate of 38.3%, numbers that are substantially higher than for the sample at women's colleges.

Given the inconsistency in national findings, it is not clear whether there is a meaningful distinction in the drinking rates of women attending women's colleges as compared with those attending coeducational colleges. More research is necessary to determine conclusively whether attendance at women's colleges mitigates against excessive alcohol use.

*Presence of a Greek system.* A number of single institution studies have found that members of Greek organizations are more likely to drink compared with other students (Klein, 1989; Lo and Globetti, 1993; Werner and Greene, 1992). Each of these studies reported that Greek affiliation—living in a Greek house, belonging to a Greek organization, intent to join the Greek system—is correlated with higher rates of heavy episodic drinking, frequency of drinking and negative consequences. The findings of these studies have been corroborated by data from the College Alcohol Study (Wechsler, 1995) and the Core Institute (Cashin et al., 1998; Presley et al., 1993b). Wechsler found that 60% of the fraternity members had been heavy episodic drinkers in high school and more than 75% of fraternity residents who had not engaged in heavy episodic drinking episodes in high school became heavy episodic drinkers in college. Greek living did make a greater significant contribution than other variables that were studied.

Cashin et al. (1998) found that fraternity and sorority leaders used more alcohol than nonmembers and members alike and speculated that these leaders are participating in setting drinking norms for their groups. An earlier data analysis (Presley et al., 1993b) found that Greek house residents had extraordinarily high levels of problematic alcohol use and negative consequences compared with students in general.

It should be noted that although the presence of a Greek system contributes to the percentage of heavy episodic drinkers on campus, there are also a number of institutions that have no Greek system and yet also have a high percentage of heavy episodic drinkers.

*Athletics.* Again multi-institutional research (Leichliter et al., 1998; Wechsler et al., 1997) has found that student involvement in athletics, whether partially involved or as a leader, is positively associated with heavy episodic drinking. Athletes were more likely to experience negative consequences of alcohol misuse and illicit substance use than nonathletes.

In addition, it has been demonstrated that athletes who are members of a sorority or fraternity are at even greater risk (Meilman et al., 1999). However, no study to date has looked at the issue in terms of percentages of campuses that have Greek organizations and athletic groups and how these relate to overall campus alcohol consumption and campus culture. Theoretically speaking, institutions that have high percentages of athletes and members of Greek organizations should demonstrate heavier alcohol consumption and related difficulties.

*Two- or four-year designation.* Data from four 2-year cohorts of colleges and universities show that students at 2-year institutions reported lower average weekly consumption levels and a lower percentage of heavy episodic drinking than students at 4-year schools (Presley et al., 1993a, 1995, 1996a,b).

#### *Physical and behavioral property variables of campuses*

*Type of residence.* Fromme and Ruela (1994) found that although parents and peers were both influential in defining standards of drinking, peers were more influential in terms of affecting actual drinking behavior. The authors suggested that normative influences vary for college students depending on *where* they reside while attending school.

We speculate that, in fact, students may seek out certain environments based on their expectancies of alcohol use. In a survey of 606 Rutgers University undergraduates, O'Hare (1990) found that there were differences in drinking rates depending on the living arrangements. Commuters living at home were more likely to be lighter drinkers than students who lived on campus. O'Hare found that men were twice as likely to be heavy drinkers if they lived on campus. However, women living independently had higher rates of heavy drinking than women living on campus or at their parents' homes. These findings appear to dovetail nicely with Harford et al.'s (1983) study, which found that the number of roommates was significantly related to drinking contexts. Students living at home were more likely to drink in nightclubs and bars, and residence hall students were more likely to drink in large, mixed-gender groups in their residences.

Differences in drinking levels were found for Core Survey respondents based on whether they lived in on- or off-campus housing (Presley et al., 1996a). The average number of drinks per week and the number of heavy episodic drinking episodes were all higher for on-campus residents as compared with off-campus residents, and students with the highest levels of consumption and heavy episodic drinking episodes were those who lived in a fraternity or sorority house (Presley et al., 1993b).

*Size and region.* Research from the Core Institute has shown that size of institution is generally associated with quantity of alcohol consumed, with students at smaller schools consuming greater amounts of alcohol on an average weekly basis than students at larger schools (Presley et al., 1993a, 1995, 1996a,b). It has also been consistently shown that students at schools in the Northeast section of the United States consume more alcohol and have higher episodic drinking rates than students in other sections of the country, with the North Central region not far behind (Presley et al., 1993a, 1995, 1996a,b). These sections of the country also show the highest figures for occasional heavy use and annual and 30-day prevalence rates among young adults generally (Johnston et al., 1998b).

*Behavioral variable: Quantity of heavy episodic drinking.* Data from the College Alcohol Study (Wechsler et al., 1999) of full-time students at 114 four-year institutions indicated that the median number of drinks consumed by all students regardless of drinking status was 1.5, yet the median number of drinks per week for frequent heavy episodic drinkers was 14.5 drinks per week. One in five students, it was found, was a frequent heavy episodic drinker. This study showed that behavioral norms for alcohol consumption varied widely among students and across colleges. This suggests the utility of looking at the characteristics of institutions where heavy episodic drinking takes place. Campuses where heavy episodic drinking takes place are different environments because of the behavior of the students, and therefore it is useful to learn more about them.

To date, there has been little published on the characteristics of institutions that have high heavy episodic drinking rates versus the characteristics of schools with low and moderate heavy episodic drinking rates. For purposes of this article and to further a discussion about this college context variable, the following analyses were conducted for this article using information from the Core Institute.

In this secondary data analysis we used data from 201 institutions across the nation that administered the Core Alcohol and Drug Survey between 1995 and 1998. The institutions were representative geographically and voluntarily chose to survey their campuses; the students within each institution were sampled in a random and representative fashion. This particular aggregation of data contains 93,536 students. This analysis is presented for demonstration and informational purposes based on suggestions from Patrick

TABLE 1. Regional location of low, medium and high heavy episodic drinking (HED) schools, in percent

Region	Low HED schools	Medium HED schools	High HED schools
West	23.1	19.7	10.8
North Central	13.8	39.4	16.9
South	44.6	13.6	18.5
Northeast	18.5	27.3	53.8

$\chi^2 = 41.35$ , 6 df,  $N = 196$ ,  $p < .05$ .

O'Malley, a fellow participant in the NIAAA-sponsored program that resulted in this supplement and a consultant in the writing of this article.

The Core Survey is designed to assess various factors related to college students' use of alcohol and other drugs. The four-page questionnaire addresses 39 topics in content areas such as demographics, usage patterns, perceptions of the campus environment, campus climate, campus violence and negative consequences that result from substance use. Reliability and validity data are available and have been described elsewhere (Presley et al., 1993a).

Schools with various heavy episodic drinking rates were identified by determining the overall heavy episodic drinking percentage at each school and then assigning the lowest third of schools to the low heavy episodic drinking (Low HED) category, the middle third to the medium heavy episodic drinking (Medium HED) category and the highest third to the high heavy episodic drinking (High HED) category. For purposes of this presentation, we are operationally defining "heavy episodic drinking" as the consumption of five or more drinks in a row in the previous 2 weeks. The percentage of students who reported heavy episodic drinking in the previous 2 weeks ranged from 9.5% to 39.1% in Low HED schools, from 39.2% to 51.5% in Medium HED schools and from 51.6% to 71.3% in High HED schools.

We then looked at the variable "size of institution" to see how the different types of schools aligned themselves. Using a chi-square analysis, we found no significant relationship with this variable (unlike the relationship with quantity measures noted above). The same was true for public/private status and for immediate location (inner city, other urban, suburban, rural, other). However, there were significant differences by regional location, with the majority of High HED schools located in the Northeast, a plurality of Medium HED schools located in the North Central states and a plurality of Low HED schools located in the South (Table 1).

We then conducted several analyses of variance looking at a number of items on the Core Alcohol and Drug Survey to see how the proportion of students in various demographic categories varied among the Low HED, Medium HED and High HED schools (Table 2).

TABLE 2. Mean percentages of students as a function of category of school

Variable	Category of school			ANOVA	
	Low HED	Medium HED	High HED	F (df)	p<
Greek member	10.8	15.2	17.2	4.301 (2/198)	.015
Age <21	54.8	61.8	64.3	7.427 (2/200)	.001
Male gender	36.7	41.2	42.9	4.951 (2/200)	.008
White	68.0	84.2	89.9	30.936 (2/200)	.000
Living on campus	49.1	59.2	65.6	6.607 (2/200)	.002
Fraternity housing	1.2	2.6	3.2	4.225 (2/200)	.016

Note: HED = heavy episodic drinking.

Based on these univariate analyses, some statements can be made about the presence of different types of groups that constitute the campus culture. Compared with Low HED and Medium HED schools, at those schools designated as High HED, more students on average belong to a fraternity or sorority, more of the student body is underage, more of the students are white, more of the students live on campus and more fraternity housing is available.

In this brief demonstration on the single variable called heavy episodic drinking, there is support for some of the research findings both in single institution studies and multi-institution studies with regard to demographic and environmental factors influencing collegiate drinking. This type of analysis represents a promising approach that can be employed with other types of variables or campus drinking typologies.

However, it may be useful to take this a step further and conduct multivariate logistic regressions predicting High HED institutions (versus Low HED and Medium HED institutions). Such a procedure was performed utilizing the univariate predictors described in the analysis above. The overall model chi-square was significant ( $\chi^2 = 55.06$ , 6 df,  $p < .0001$ ), but the only significant predictors (based on the Wald test and significant odds ratios [ORs] at the 95% confidence interval) were male gender (OR = 1.05; range: 1.02-1.08) and white race (OR = 1.18; range: 1.06-1.18).

These analyses indicate that institutions with a larger proportion of males are 1.05 times more likely to be High HED institutions. Institutions with a large majority of white students were approximately 1.2 times more likely to be High HED institutions.

The same analyses were performed to predict Low HED institutions (versus Medium HED and High HED). Although the model was significant, even for Low HED institutions, only male gender and white race were significant predictors. Institutions with Low HED rates were slightly less likely to have a high percentage of male and white students. Although previous analyses have indicated that blacks and whites at historically black institutions consumed less alcohol than blacks and whites at predominantly white institutions, an analysis was performed to determine the level

of heavy episodic drinking by nonwhites at the three categories of institutions (Low HED, Medium HED and High HED). A cross-tabulation was performed between heavy episodic drinking by minority students and the heavy episodic drinking level of the institution ( $N = 17,165$ ). The resulting chi-square was significant ( $\chi^2 = 477.30$ , 2 df,  $p < .001$ ). The heavy episodic drinking percentages for nonwhites at the Low HED, Medium HED and High HED institutions were 23.9%, 32.8% and 43.7%, respectively. Minority students at Low HED, Medium HED and High HED institutions engaged in heavy episodic drinking practices in environments that foster that behavior, although their rate of heavy episodic drinking was lower than that of white students.

#### *Campus community property variables*

Every college or university has an institutional culture that differs from that of every other institution, whether it is based on student demographics, entrance requirements, cost, traditions, competitiveness, athletics, size or region of the country. However, there are some other external environmental variables that may influence drinking. These factors include the availability of alcohol, pricing, density of distribution outlets (i.e., bars and clubs) in the area surrounding the campus, the social settings where drinking takes place and campus customs. Such factors all play a role in shaping the drinking environment for students (Newman et al., 1991). It is not within the scope of this discussion to describe student- and peer-related factors that impact on the drinking environment, but rather to discuss environmental factors—community availability, pricing, server density—that affect student drinking behavior. As Sanford (1962) said, “If we are interested in understanding the institution, we must identify and appreciate how the external environment shapes the institution” (p. 73).

*Pricing.* Using statistical economic simulation techniques, Chaloupka (1993) found that increases in alcohol beverage prices would lead to substantial reductions both in the frequency of youth alcohol consumption and in heavy drinking among the young. In addition, utilizing the same technique and six nationally representative data sets, he found that alcohol use and motor vehicle accident mortality rates were negatively related to the cost of alcohol and concluded that college completion rates are positively related to this cost. Chaloupka found that the effects of excise tax hikes on drinking exceeded the effects of establishing the uniform legal drinking age of 21 in all states studied. In 1998, Chaloupka et al. (1998) expanded the concept of price and economic impact to include not only the monetary price of alcoholic beverages, but also a wide variety of other “costs” of drinking and heavy drinking, including time spent obtaining alcohol and legal costs associated with drinking-related behavior. This research

clearly demonstrates that increases in total cost can significantly reduce consumption and thereby many of the problems associated with alcohol use and misuse.

Although these studies were not specifically designed for assessment of university policies, they certainly pose interesting research questions with regard to pricing issues in and around the campus environment.

*Outlet density and drinking venues.* A concept that has risen to the forefront of the prevention research agenda entails going beyond some of the previously described factors related to drinking risk and looking at the environmental context of drinking (Clapp et al., 2000). Although there is no standard definition for drinking contexts, Clapp et al. (p. 141) utilized the Harford (1978) definition: “The antecedents of alcohol consumption are to be found in the interaction between the individual and his environment . . . the consumption of alcoholic beverages is situationally specific, rather than a trans-situational property of specific individuals” (p. 289).

In their study, Clapp et al. (2000) found that parties, dates and socializing and being with friends were the most common situations where students reported their last heavy drinking event took place. (In addition, for males, playing drinking games increased the likelihood of experiencing alcohol-related problems in these settings by a factor of five.) Similarly, in a broader national study of drinking contexts, Hilton (1991) reported that across all types of consumption patterns, the presence of coworkers, close friends and neighbors increased the amount of alcohol consumed. Hilton also found that men drank more than did women in bars and public places as well as at private parties.

Although the Clapp et al. (2000) study is a single institution collegiate study, it is well constructed and scientifically rigorous in its methodology. It explores some contextual variables that may engender risk for students on college campuses and also identifies protective factors. The authors strongly suggest that research into college student drinking should utilize both individual variables as well as the contextual variables antecedent to drinking.

According to Gruenewald (1999), research has shown three things: (1) population growth leads to a greater number of alcohol outlets, (2) greater numbers of outlets relate to greater alcohol use and (3) greater use results in alcohol-related problems. Although this research is mainly focused on the community setting, his description of the community is analogous to that which exists for many colleges. His research found that, when outlet concentrations increased and multiple drinking venues existed, both long-term and short-term drinking problems also increased. His research study is awaiting final publication, but his initial approaches describing availability, density and server training variables as community prevention strategies are preliminarily leading to reductions in injury, assaults and other alcohol-related negative consequences. This approach must be studied further to assess the impact on college student drinking.

The significance of this research is that bars, parties and Greek organization events appear to be a popular way for college students to socialize and engage in alcohol use and problematic use. Thus there may be some impact on student drinking if the number of on-campus and near-campus sites where students can drink can be reduced. Research suggests that increasing the cost per unit of alcohol would also help.

### **Conclusion: Research Issues and Implications**

There are many unresolved issues with regard to research in this field but one of the most basic is how to determine the extent to which student drinking can be attributed to particular factors in the educational setting. Logically, we should consider a model of prevention that addresses the environment, student campus culture and various individual factors to reduce high-risk alcohol use. In other words, we need a cogent model that brings all these factors together to make a complete picture.

Given the complexities of campus environments, and in defining components of these environments, it is somewhat difficult to firmly establish what are the most compelling environmental causative factors. Colleges and universities are embedded in an extraordinary number of environments as well as an ever-changing contemporary social scene and collegiate culture. Confounding the environmental issue, each college attracts students who choose on an individual basis to drink or not drink for a variety of reasons that have no relation to the collegiate environment.

A good deal of research on the collegiate population has shown that individual characteristics are not always the best predictors of safe and responsible drinking patterns. Identifying institutional variables such as size, public or private control and gender or racial makeup has provided researchers with an aggregated list of potential predictors. Although this helps, to date this research has proved to be of limited value. Rigorous analytical techniques applied to regression models and structural equation modeling have also contributed some as well, but not much more than the descriptive analyses provided by other, simpler studies. On a practical level, what we know may be interesting, but one cannot ordinarily use this knowledge to manipulate a college's characteristics for the sole purpose of changing the college's drinking culture.

One way of approaching the problem would be to attempt to match or equate college environments in some respects and see how they compare on other variables. This approach is workable with only a small number of variables; the impracticality of matching colleges on many variables becomes evident quickly when one looks at the potentially vast array of collegiate characteristics.

Another complicating factor in this line of inquiry relates to variations in the units of analysis that are employed.

Many different units of analysis have been identified, and these add richness to the field but also complicate the ability to make firm statements about what is known. For example, a unit of analysis can be the student, the institution, certain categories of students, certain types of institutions or particular categories of students within particular types of institutions. Another unit of analysis issue revolves around measures of alcohol consumption: Do we use quantity, or frequency, or a categorization of use based on quantity *and* frequency? The high-risk/heavy episodic drinking measure can be identified as four or more drinks in a sitting, five or more drinks in a sitting or more than five drinks in sitting; and the time frame for this can be 2 weeks or 30 days, depending on the study. Differing cut points and time frames can seriously affect the conclusions we reach. Thus, in multi-institutional samples where data are aggregated, it is not often easy and sometimes controversial to determine which units of analysis should be employed. At the same time, focusing on the simplest unit and focusing on answering one question at a time do not do justice to the complexity of relationships that may exist.

Despite the methodological inconsistencies and variations in the reported studies, there are commonalities in what is known. There exists incontrovertible evidence that many students drink often and some drink to harmful levels. There is consistent information regarding the negative consequences of drinking. There are regional differences, racial differences and gender differences. There are also differences relating to housing, athletics and Greek organization affiliation. More emphasis on multivariate techniques may be necessary to begin to capture the complexity here.

We believe that models need to be developed where the institution and the individual are examined in relation to each other. This means identifying relevant variables and producing study designs based on what is presently known from the college alcohol literature and also extending our grasp outward into areas traditionally handled by the fields of organizational behavior, community psychology, sociology and social psychology.

To further the discussion in this area and move the field forward, we offer some additional research suggestions:

- Since outlet density and pricing are shown to be highly correlated with drinking, studies need to be conducted that look at these factors with respect to colleges. Specifically, baseline studies on outlet density and pricing need to be conducted, and then analyses need to be performed that explore the relationship between density and pricing on the one hand and the presence of high heavy episodic drinking schools on the other hand.
- Studies need to be conducted in the area of "self-selection," that is, whether students perceive and accurately identify the "high heavy episodic drinking institutions" and self-select for matriculation at these institutions.
- Studies need to be conducted as to how prospective students arrive at their perceptions of institutions as having a high rate

of drinking. For example, are those perceptions based on word of mouth, *Playboy* magazine rankings of party schools, alumni reports, current students' reports, general reputation, accessibility to bars or tolerance of the administration?

- Studies need to be designed that assess the surrounding community's tolerance of drinking. For example, do the local outlets have a reputation for "easy carding" policies, penny "drink nights," ladies nights and other marketing activities intended to promote excessive drinking targeted at college students?
- Although research has been conducted in the area of students' perceptions of *other students' drinking*, research has not yet been conducted in the area of perception of the campus' drinking norm relative to *other campuses' drinking norms*. In other words, do students perceive their campus as having higher use, less use or about the same use as other college campuses and how does this relate to consumption? Such analyses have the potential to explain some of the variance from an institutional/environmental context.
- Although the environment and the context of drinking occasions is important, research that truly seeks to understand the nature of the problem on campuses must also include individual variables. For example, aside from perceptions regarding schools' reputations for heavy episodic drinking, the availability of alcohol and other factors noted above, what are students' individual beliefs about alcohol, drinking histories, developmental expectations and perceptions of risk, which may increase the probability of high-risk drinking patterns within the college setting?

The issue is complex, and addressing the problem is complicated. Models for a solution must be powerful enough so that we can arrive at cogent, integrated responses that will help us move forward.

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