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Heavy Drinking in College Students: Who Is at Risk and What Is Being Done About It?

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Abstract

Problem drinking and related consequences are a major social issue plaguing college campuses across the United States. Each year, alcohol is responsible for fatalities, assaults, serious injuries, and arrests that occur among college students. The authors review and discuss the risk factors, drinking patterns, and consequences that are relevant to the general student population. In addition, the authors highlight individuals at an increased risk of experiencing alcohol-related problems, such as Greek-letter social organization members and student athletes. The authors also discuss the interventions that attempt to reduce risky drinking and related problems in these subgroups as well as the future directions for research.

Keywords

alcohol; college drinking; high-risk drinking

COLLEGE STUDENT HEAVY DRINKING and alcohol-related consequences are major social problems in the United States (Perkins, 2002; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). Twenty years of research has revealed that the highest proportion of heavy drinkers and individuals with diagnosable alcohol-use disorders and multiple substance dependencies are in the age range encompassing over 90% of all enrolled college students, the majority of these individuals being between the ages of 18 and 21 (Grant, 1997; O'Malley & Johnston, 2002). Alcohol drinkers are more likely to have been insulted by others; been confronted with unwanted sexual advances; been a victim of date rape or sexual assault; been in a serious argument or quarrel; been pushed, hit, or assaulted; had their property damaged; been in a situation where they had unplanned sexual activity; put themselves in situations where they were more susceptible to sexually transmitted diseases such as HIV; been injured or had life-threatening experiences; driven while intoxicated, or ridden in a car with an intoxicated driver (Abbey, 2002; Cooper, 2002; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). Reports such as the following are not uncommon (Turrisi, Jaccard, Taki, Dunnam, & Grimes, 2001):

“My friend had a drinking contest with her boyfriend. They each had five shots of Wild Turkey, two beers, and then started a ‘power hour’ or ‘century’—one shot of beer per minute for 60 minutes. My friend began falling down and looked ill. She laid down to go to sleep and began throwing up for two hours straight. She rolled over and almost choked in her vomit” (anonymous college freshman).

Heavy drinkers are not the only ones who have experienced adverse consequences. Nondrinking college students have their own stories to tell about how others' drinking has affected them:

"My roommate came home very drunk. I didn't want to deal with it. I had three tests the next day and had planned to study instead of playing 'mom.' I was really scared though. She was throwing things everywhere and crying. She really stunk and was disgusting. I especially didn't want her to puke in my room. I flunked one test and skipped another; I was so drained. I didn't speak to her at all the next day" (anonymous freshman college student).

Although these anecdotal reports of experiences may be enlightening and motivating to administrators, teachers, public health officials, and anyone else close to students, the epidemiological data reveal just how widespread and damaging the consequences of college student drinking can be. For example, Hingson and colleagues (2002) estimated that approximately 42%, or over 3 million of the 8 million students attending colleges in the U.S. have consumed five or more drinks during a single drinking occasion within the past 30 days. Alcohol is cited as being responsible each year for 1,400 student deaths; 500,000 unintentional injuries; 600,000 student assaults; 112,000 arrests; and 2.1 million cases (approximately 1 in 4) of driving under the influence of alcohol (Hingson et al.).

For some students, excessive alcohol consumption and the related negative consequences emerge after matriculation to college. However, research also consistently indicates that, for many students, excessive consumption in college represents a continuation or escalation of drinking patterns established earlier (Baer, Kivlahan, & Marlatt, 1995; Gonzalez, 1989; Leibsohn, 1994; Lo & Globetti, 1993; Schulenberg & Maggs, 2000; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler, Dowdall, Davenport, & Castillo, 1995). Researchers have argued for improved efforts to detect and prevent heavy drinking earlier, such as the first year of high school or sooner (Baer, 1993; Baer et al., 1995; Johnston, O'Malley, & Bachman, 1997; Schulenberg, O'Malley, Bachman, Wadsworth, & Johnston, 1996). Although early detection and prevention efforts may reduce high-risk college drinking, there is sufficient evidence that additional efforts should target the transition period between high school and college and post-matriculation. For example, a significant number of students adopt heavy-drinking tendencies for the first time during their first year in college. Consider a random sample of 1,000 male high school students. Johnston and colleagues (1997) found approximately 10% of men in high school have heavy-drinking tendencies. On the basis of a study by Wechsler, Issac, Grodstein, and Sellers (1994), approximately 80% of these high school heavy episodic drinkers are likely to be college student heavy drinkers. Using estimates from Wechsler, Issac, and colleagues (1994), of the remaining 900 students who did not drink heavily in high school, approximately 1 out of 4 (225 individuals) develop heavy-drinking tendencies in college. Thus, of the 305 men who exhibit heavy-drinking tendencies in college, a substantial percentage may not be identified as being at-risk as a function of their drinking behavior in high school. Reports with different estimates of high school and college drinking tendencies yield slightly different results, but the example suggests that a significant percentage of individuals develop heavy-drinking tendencies in college who were not heavy drinkers in high school. Intervention efforts aimed to reduce the number of new heavy drinkers are an important component of strategies geared toward lowering heavy drinking among college students.

In response to these reports, college administrators have adopted more intensive on-campus alcohol and drug abuse education and prevention programs (Dodge, 1991; Kunz, Irving, & Black, 1993; Magner, 1988; Morritz, Seehafer, & Maatz-Majestic, 1993). Despite efforts, the magnitude of college student drinking and alcohol-related problems has not decreased significantly in the past 15 years (Hingson et al., 2002; Schuckit, Klein, Twitchell, & Springer,

1994; Wechsler, Issac, et al., 1994). However, the climate of research on college drinking has changed dramatically in recent years, primarily because of significant efforts by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). In 1998, the NIAAA established a Task Force on College Drinking that include college presidents and research scientists. The Task Force focused on assessing the current needs of college administrators and accumulating findings from the scientific literature that could be useful in addressing those needs. Concurrently, the NIAAA developed funding mechanisms to support the development and evaluation of efficacious interventions and to assess issues in the implementation of evidence-based interventions on college campuses. Together, these efforts have resulted in good reviews of college student drinking, morbidity, and mortality (Hingson et al.); college environments (Presley, Meilman, & Leichter, 2002); and individual-focused interventions (Larimer & Cronce, 2002). They have also resulted in decreases in risky sexual behavior (Cooper, 2002), sexual assaults (Abbey, 2002), and other negative sexual consequences of drinking (Perkins, 2002). In addition, there have been several evidence-based intervention approaches that are now being evaluated for implementation on campuses or in the neighboring communities that were not in existence 10 years ago (Barnett et al., 2004; Fromme & Corbin, 2004; Neighbors, Larimer, & Lewis, 2004; Turrisi et al., 2001). Despite these advances, there are still areas of need. For example, there remain groups of college students who are at an increased risk of engaging in risky drinking and experiencing alcohol-related problems. Data from efficacy studies that target these individuals are limited, and more research is necessary to develop sound interventions. In our review, the focus is on groups of students who research shows are at the greatest risk for heavy drinking and alcohol-related problems: Greek-letter social organization members and college athletes. We also examine the etiology and intervention efforts to illustrate recent advances and highlight areas where research is needed.

Members of Greek-Letter Social Organizations

Within the general college student population, members of social fraternities and sororities are more likely than are other students to engage in high-risk drinking and substance use and to experience related problems (Alva, 1998; Borsari & Carey, 1999; Caron, Moskey, & Hovey, 2004; Cashin, Presley, & Meilman, 1998; McCabe et al., 2005; Meilman, Leichter, & Presley, 1999; Presley et al., 2002; Wechsler, Kuh, & Davenport, 1996). In particular, men living in social fraternity houses drink more in terms of both quantity and frequency, and as a result, experience more adverse consequences than do non-Greek student members (Alva; Borsari & Carey; Meilman et al.; Wechsler et al., 1996). Specifically, McCabe and colleagues found that, compared with nonmembers, significantly more fraternity and sorority members (70% of men and 50% of women) engaged in binge drinking (defined as consuming five or more drinks during a single drinking occasion for men and four or more drinks for women) during the 2 weeks prior to the study (42% of men, 29% of women). In addition, Cashin and colleagues reported that the average number of drinks consumed per week is significantly higher for Greek fraternity and sorority members (men: 12 drinks per week, women: 6 drinks per week) than for non-Greek fraternity and sorority members (men: 6 drinks, women: 2 drinks). Furthermore, although many of the negative consequences experienced by Greek members are prevalent among college students (e.g., hangovers, blackouts, unplanned sexual activity, and academic problems), fraternity and sorority members report experiencing these consequences at a much higher rate than do nonmembers (see Table 1). However, there are exceptions. Larimer, Anderson, Baer, and Marlatt (2000) found that, within sororities, women who were classified as low- and high-frequency drinkers experienced similar rates of adverse consequences. However, the total number of such consequences was lower for the sorority women than for high-frequency female drinkers who lived in the residence halls, which suggests that being a sorority member may provide some protection against negative consequences for high-frequency drinkers. In addition to consequences typically experienced by college students, a significant subset of social and fraternity sorority members also report more severe symptoms

typically associated with the diagnosis of alcohol dependence (Diagnostic and Statistical Manual of Mental Disorders [*DSM-IV*]; American Psychological Association, 1994), such as difficulty stopping or controlling drinking, increased tolerance, and withdrawal. Successfully implementing interventions to reduce problem drinking in this environment has been challenging because fraternity members generally do not express concern about their drinking behavior and live in an environment that often supports heavy drinking (Borsari & Carey, 1999; Dielman, 1990; Goodwin, 1989; Harrington, Brigham, & Clayton, 1999; Klein, 1989; Larimer et al., 2000; Shore, Gregory, & Tatlock, 1991; Tampke, 1990a, 1990b).

Individual characteristics have an impact on individual's decisions to join the Greek social system. Research has shown that individuals with positive expectancies and attitudes toward alcohol use tend to gravitate toward environments and social groups that foster high-risk drinking (Borsari & Carey, 1999; Cashin et al., 1998; Klein, 1992). Furthermore, these individuals also tend to feel more favorable toward heavy drinking in both themselves and others, and have experience with alcohol and substance abuse (Baer et al., 1995; Cashin et al.; Klein; Larimer et al., 2000; McCabe et al., 2005). Research has shown that individuals who engaged in heavy alcohol and substance use and experienced related problems in high school often self-select into fraternities and sororities (Larimer et al., 2000; McCabe et al.; Read, Wood, Davidoff, McLacken, & Campbell, 2002); however, this pattern is more prevalent in men than in women (Baer et al., 1995). This self-selection process into fraternities in particular, is higher for men who tend to place a high priority on socialization, peer relationships, and have a higher need for acceptance (Borsari & Carey; Marlowe & Auvenshine, 1982; Wilder, Hoyt, Surbeck, Wilder, & Carney, 1986). Greek affiliation and constant exposure to other fraternity and sorority members is thought to reinforce or exacerbate preexisting risky drinking patterns (Bartholow, Sher, & Krull, 2003; Lo & Globetti, 1995; McCabe et al.).

Peer influences also play a role in the heavy drinking of fraternity and sorority members. The presence of heavy-drinking peers significantly increases alcohol consumption, whereas exposure to light-drinking peers has the reverse effect (Caudill & Marlatt, 1975). Considering that most of the alcohol consumed by Greek social members takes place in fraternity houses (Arnold & Kuh, 1992; Wittman, 1989), observing heavy drinking by peers is common. Inflated normative perceptions such as quantity, frequency, and acceptability of drinking among Greek members have been shown to perpetuate heavy drinking (Baer, Stacy, & Larimer, 1991; Goodwin, 1989; Larimer, 1992; Larimer, Turner, Mallett, & Geisner, 2004; Sher, Bartholow, & Nanda, 2001). Typical fraternity members approve of heavy alcohol use and perceive it as a common behavior among peers (Borsari & Carey, 1999; Cashin et al., 1998). Unfortunately, alcohol use is valued and directly influences the popularity of being in a fraternity (Larimer, Irvine, Kilmer, & Marlatt, 1997). The perceived norms that value heavy drinking, in conjunction with peer modeling of excessive drinking behavior within the Greek system, constitute barriers to individual change, and serve as challenges to implementing successful interventions, particularly in heavy-drinking Greek-letter social organizations (Harrington et al., 1999; Larimer et al., 1997).

Interventions Aimed at Greek Fraternity and Sorority Members

With little research to guide intervention efforts for drinking problems that occur within the Greek social system, and the potential for liability of related accidents, injuries, and deaths on campus, many universities have implemented policies that aim to reduce problem drinking and to manage liability. Although there is a growing body of literature on policy interventions to reduce drinking and its related consequences (Wagenaar & Toomey, 2002), this continues to be an area in which research is lacking with respect to college students. In addition, some research suggests that such policies have actually increased risky drinking behavior and its related negative consequences among college students (George, Crowe, Abwender, & Skinner,

1989; Gonzalez, 1990; Schall, Kemeny, & Maltzman, 1991; Williams, Kirkman-Liff, & Szivek, 1990). Considering fraternity and sorority members, Kilmer, Larimer, Parks, Dimeff and Marlatt (1999) evaluated a policy by the University of Washington to replace kegs with a "bring your own booze" policy at Greek social functions. The policy also prohibited using pooled funds to buy alcohol and mandated enforcing laws prohibiting alcohol consumption by individuals less than 21 years of age. In addition, both fraternities and sororities were required to participate in one educational program per quarter that focused on issues of alcohol and related topics. Kilmer and colleagues found that, one year after implementation, fraternity and sorority members were drinking less frequently, but consuming more alcohol per occasion. These findings suggest that the policy inadvertently increased risky drinking behavior in an attempt to curb it.

As shown in Table 2, starting in the early 1990s, individual prevention approaches began to emerge with demonstrated efficacy among fraternity and sorority members (Baer et al., 1992; Fournier, Earhart, Glindemann, & Geller, 2004; Garvin, Alcorn, & Faulkner, 1990; Larimer et al., 2001; Marlatt et al., 1998; Thompson, 1996; see Larimer & Cronce 2002, for a comprehensive review of college student drinking interventions). Both Baer and colleagues and Marlatt and colleagues utilized a brief motivational enhancement approach combined with feedback and skills training of both members and nonmembers of fraternities and sororities. Incoming first-year students, who were classified as being at high risk for alcohol problems on the basis of their high school drinking patterns, were provided with a 1-hour feedback interview to reveal their alcohol use, related consequences, expectancies, and beliefs. Although the content of this feedback interview was similar to other cognitive-behavioral skills training approaches, the style or process of the interview was developed on the basis of the theory and techniques of motivational interviewing (Miller & Rollnick, 2002). Motivational interviewing emphasizes the provision of accurate, nonjudgmental feedback to the client's risks and experience of alcohol-related problems, while avoiding labeling, confrontation, or specific interviewer-generated goals for behavior change. With fraternity and sorority members, results showed that individuals who received the feedback interview reported less drinking and fewer adverse consequences than those in the control group after 3 months. At a 3-year follow-up, participants had maintained these reductions. It is important to note that, although the study demonstrated modest success in reducing drinking among Greek system members, these students, particularly fraternity members, continued to report significantly heavier drinking and significantly more adverse alcohol-related consequences than did students who were not members of fraternities or sororities.

Larimer and colleagues (2001) randomly assigned pledge class (first year) members of fraternities to receive either a 1-hour feedback session about their self-reported drinking behaviors, beliefs, and related consequences, or treatment as usual (typically a 1-hour didactic alcohol education lecture delivered to the entire fraternity chapter). Each feedback session included a skills-training component and was delivered using the principles of the motivational interviewing approach described earlier (Miller & Rollnick, 2002). At the 1-year follow-up, the study showed a significant reduction in alcohol consumption among pledge class members who received the intervention compared with participants in the treatment-as-usual group. Larimer and colleagues noted no significant differences in the number of adverse drinking consequences reported by participants in the two groups.

Garvin and colleagues (1990) obtained similar results with a selective prevention approach. Entire pledge classes of four fraternities were randomly assigned to four conditions: (a) a typical alcohol education class, (b) a cognitive-behavior alcohol skills training class, (c) training in self-monitoring of alcohol consumption alone, or (d) no intervention. Overall, participants in both the skills training condition and the self-monitoring-only condition showed significant reductions in drinking as compared with those in the other two conditions at the final 6-month

follow-up assessment. Again, participants who received these interventions continued to drink more than did nonmembers of fraternities, reporting an average of 15–20 standard drinks per week at follow-up. The study had several limitations, including a small sample size and a possible confound between program effects and organization effects in that the authors did not take into account the differences in alcohol consumption across particular fraternities. Another limitation is that some fraternities tend to consider the pledge period an initiation process where there may be hazing that involves peer pressure to drink. Future research should address such practices and the implications for alcohol abuse and consequences in these social contexts.

Research has also shown that members will drink less at fraternity parties if given incentive to do so. For example, Fournier et al. (2004) gave students information about blood alcohol content (BAC), including personalized BAC charts, and told them they were eligible to win a cash prize if they kept their blood alcohol level below .05 during the course of the evening. Individuals at such intervention parties had significantly lower blood alcohol levels compared with individuals at control parties.

Although some successful interventions have emerged, certain interventions that have shown promise in the general college student population have not shown the same success in fraternities and sororities. For example, interventions aimed to correct inaccurate and inflated peer norms of drinking behavior and approval of heavy drinking have faced numerous barriers in the Greek organization population (Barnett, Far, Mauss, & Miller, 1996; Carter & Kahnweiler, 2000). First, research has indicated that, in some of the heaviest-drinking fraternities, members accurately estimate the normative drinking patterns of their fellow members instead of overestimating it (Larimer et al., 1997, 2004). Second, the actual normative drinking behavior among fraternity and sorority members, particularly among the men, is extremely risky, and, therefore, it is difficult to argue that a healthy drinking norm exists about which to inform students. Further, general campus drinking norms may not be viewed as relevant to Greek members, and thus may be unlikely to influence their behavior (Carter & Kahnweiler). This has led to questions regarding the efficacy of normative feedback interventions for curbing fraternity and sorority drinking (Carter & Kahnweiler), though others have argued that normative feedback is an important component of efficacious interventions for this population (Larimer et al., 2001, 2004).

Student Athlete Drinking

Athletes, like university Greek-letter social organization members, are considered a high-risk college group for problem alcohol use and associated negative consequences (Larimer & Cronce, 2002; Meilman et al., 1999). Early studies suggested that athletic participation served as a protective factor for students from alcohol-related issues (Strauss & Bacon, 1953); however, although research focusing on drinking etiology in college athletes is limited, recent research shows that athletes drink more frequently and consume more per occasion than do their nonathlete peers (Hildebrand, Johnson, & Bogle, 2001; Leichliter, Meilman, Presley, & Cashin, 1998; Nattiv & Puffer, 1991; Nelson & Wechsler, 2001; Selby, Weinstein, & Bird, 1990; Wechsler, Fulop, Padilla, Lee, & Patrick, 1997). Furthermore, existing studies on athlete drinking tendencies show that, as athletic participation increases, so does alcohol consumption (Leichliter et al.; Meilman et al.; Nattiv & Puffer; Wechsler et al., 1997).

In studies involving college student athletes, researchers collected data on substance use and abuse habits from athletes who competed in various sports in a large, nationally representative sample of collegiate institutions in all National Collegiate Athletic Association (NCAA) divisions (i.e., I, II, III). In the multiple studies examining collegiate athlete alcohol use, consistent themes have emerged from the large data collections. Overall, researchers have identified athletes as consuming more alcohol, and experiencing a higher rate of alcohol-related

negative consequences as compared with nonathletes. In addition, more athletes than nonathletes have been categorized as heavy episodic, or binge, drinkers (Hildebrand et al., 2001; Leichliter et al., 1998; Nelson & Wechsler, 2001; Wechsler, Davenport, Dowdall, Grossman, & Zanakos, 1997). Some studies have shown that college and high school athletes begin drinking at earlier ages (Hildebrand et al.; Thombs, 2000; Wechsler et al., 1997), and engage in more risky behaviors than do individuals who have never been athletes (Hildebrand et al.; Leichliter et al.; Meilman et al., 1999). In comparisons between men and women athletes, few significant gender differences have been observed in past studies; however, drinking pattern differences based on race or ethnicity are notable in that Caucasian athletes drink at higher rates than do African American or other racial and ethnic group athletes (Green, Uryasz, Petr, & Bray, 2001; Hildebrand et al.; Leichliter et al.; NCAA, 2001; Nelson & Wechsler; Wechsler et al., 1997). In addition, Leichliter et al. found no support for the hypothesis that athletes in leadership positions use alcohol more responsibly than do other team members.

A number of studies have been conducted to examine athlete groups independently of nonathlete groups to gain a sense of drinking patterns, rates, and experiences related to alcohol use. In the 2001 NCAA Study of Substance Use Habits of College Student Athletes, a comprehensive study of 21,225 athletes reported 79.5% of collegiate athletes drank alcoholic beverages in the past 12 months. According to student athlete data from this study, 65.4% reported having had a hangover, 52.4% reported nausea or vomiting, 43.7% reported doing something they later regretted, 43.2% reported missing a class, 35.1% got into an argument or fight, 33.3% reported doing poorly on a test, 29.7% drove a car while under the influence, 29.3% had a memory loss, 20% have been hurt or injured, 17.5% have been in trouble with police, residence hall, or other college authorities, and 11.5% have been taken advantage of sexually as a direct result of using alcohol or drugs in the past 12 months. Despite these high rates of negative consequences associated with student athlete drinking, drinking rates have remained high over the past decade, with only slight decreases in overall alcohol consumption (NCAA, 2001). Interestingly, studies have shown drinking decreases among athletes during their competitive sport season (Bower & Martin, 1999; Martin, 1998; NCAA; Selby et al., 1990; Shields, 1998). It is also important to note that few differences have been observed in sport affiliation; variations in men's alcohol consumption range from 68.8% of track and field athletes (low) to 95.6% of ice hockey athletes (high). For women's sports, 71.3% of track and field athletes (low) report drinking, compared with the highest reported group, lacrosse players (93.4%; NCAA). Finally, comparisons among NCAA Division athletes show Division III athletes consuming alcohol at higher rates than their Division I and II peers (Green et al., 2001; NCAA).

With an understanding of the high prevalence of student athlete alcohol consumption and its connected consequences, the reasons behind alcohol use and nonuse have been widely debated. A variety of motives for alcohol use among athletes have been suggested, including a coping mechanism or for conformity (Damm & Murray, 1996), the increase in social opportunity and availability (Tricker, Cook, & McGuire, 1989), and the experience and enhancement gained from use (Nattiv, Puffer, & Green, 1997). With such a wide range of suggested motives and beliefs, it is difficult to determine the underlying reasons for heavy drinking in this population. Studies have identified social purposes (drinking to feel good, peer influence, drinking to deal with the stress of school and athletics, and drinking to have fun) as primary reasons for alcohol use (Bower & Martin, 1999; Green et al., 2001; Martin, 1998). Also, it is important to identify the reasons athletes choose not to use alcohol. Health, sports performance, coaches' rules, the taste, and weight gain were the primary deterrents for individuals (Bower & Martin; Martin).

An additional group of studies has been conducted in an attempt to identify underlying factors associated with high drinking rates of student athlete populations, which have led to a more comprehensive view of athlete drinking etiology (Miller, Miller, Verhegge, Linville, &

Pumariega, 2002; Storch, Storch, Killiany, & Roberti, 2005; Wilson, Pritchard, & Schaffer, 2004). Miller and colleagues focused on underlying psychiatric symptoms in which athlete populations have reported higher levels of alcohol abuse in connection with higher levels of depressive and other psychiatric symptoms. As participants' severity of depressive and general symptoms increased, so did their level of alcohol misuse (Miller et al.). However, Wilson and colleagues (2004) noted that men athletes tended to drink for social reasons and to "get high." In this study, college women athletes and nonathletes, and men nonathletes tended to drink for coping reasons (i.e., they used alcohol to feel better), which was significantly related to greater quantity and frequency of alcohol consumption and incidence of drunkenness. Therefore, coping tactics seemed to explain alcohol abuse for each group except men athletes. Storch and colleagues suggested that elite intercollegiate women athletes experience elevated levels of depressive symptoms, social anxiety, and a perception of less social support than do their nonathlete women peers. However, in the sample of studies by Storch and colleagues, mental health problems were not especially prominent among the women athletes in the group. In the absence of mental health issues, the relationship between gender and drinking within the student athlete population tends to mirror general student body trends in that men drink more heavily and more frequently than do women (Green et al., 2001; Hildebrand et al., 2001; Wechsler et al., 1997; Wilson et al.).

Research with college student athletes also identified peer influence as having an impact on drinking tendencies. Seventy-two percent of NCAA athletes reported that more than half of their team consumed alcohol within the last year (NCAA, 2001). In a study by Thombs (2000), student athletes tended to perceive that their teammates consumed more alcohol than they did themselves, while they believed that the typical university student consumed more alcohol than did their typical teammate. Consistent with the general student body, student athletes tend to overestimate the amount and frequency of alcohol use by peers. The social norms theory contends that substance abuse behavior is influenced by the biased perceptions social group members have of their peers (Berkowitz, 1997; Thombs & Hamilton, 2002).

Interventions Aimed at Athletes

Because of the overall lack of understanding regarding influences that affect student athlete drinking, few interventions have been developed to target this high-risk group. Marcello, Danish, and Stolberg (1989) and Gregory (2001) published intervention control trials for college athletes, and Thombs and Hamilton (2002) discussed the effects of a social norm feedback campaign with Division I student athletes. Marcello and colleagues found no reduced drinking effect when evaluating a multicomponent skills training intervention with college athletes. Gregory focused on college athletes and met minimum inclusion criteria in a controlled intervention trial. In the study, Gregory compared three interventions: (a) a three-session feedback and skills group that contained personalized feedback on alcohol use, norms, consequences, as well as risk-reduction skills; (b) a two-session feedback with minimal focus on skills training; and (c) a group that used a workbook with similar information as the other two groups but independently. Individuals in the three-session feedback group had the largest decrease in perceived drinking-related norms and positive expectancies related to alcohol use. In addition, individuals in both feedback groups reported experiencing significantly fewer alcohol-related negative consequences than did those in the workbook group. It is important to note that, although Gregory observed reductions in alcohol-related norms, expectancies, and consequences, there were no significant decreases in actual alcohol consumption within any of the conditions. Because of the lack of a no-treatment control group, more research that examines intervention effects within the college athlete population is needed.

Thombs and Hamilton (2002) evaluated the effects of a social-norms-based feedback campaign at three Division I universities in Ohio. Their goal in this nonexperimental study was to assess

the campaign's effects on the perceived drinking norms and behaviors of athletes at the participating institutions. Thombs and Hamilton used display ads, bus-rider signage, high traffic area poster displays, dining area table tents, athletic department promotional material, classes and small-group presentations, and mass mailings to publicize the campus norm messages to the targeted population. They surveyed 566 student athletes over a 4-week period to evaluate the estimated blood-alcohol content, number of drinks consumed, alcohol-related consequences in the past 30 days, binge drinking rates, in- and out-of-season drinking rates, typical drinking patterns, age of drinking onset, and perceptions of peer norms. General findings showed that athletes exposed to the social-norm campaign materials perceived less alcohol use in their campus environment when compared with nonexposed peers. Data showed that, after three campaign semesters, there was a positive impact on perceived drinking norms, yet no effect on drinking behaviors. Although the exposed participants reported significantly lower levels of peer drinking, there was no significant group difference on the typical number of drinks consumed by closest friends. Results showed that social norms feedback campaigns can effectively alter most perceptions of campus drinking norms for Division I athletes, yet there is no evidence to show that close-friend-alcohol-use perceptions or changes in personal drinking behaviors were affected. Again, because of the nonexperimental design of this study and the absence of collected baseline information, Thombs and Hamilton recommend caution in the use of their data in interpreting the findings of the study. The authors do, however, identify the challenge of using social-norm feedback interventions with high-risk populations such as collegiate student athletes.

Overall Summary

High-risk drinking and related consequences continue to be problems within fraternities and sororities and among student athletes. Although more research is clearly needed, some evidence of promising research and demonstrations of the efficacy of interventions targeting fraternity and sorority members have emerged. Overall, few interventions have used the collegiate student athlete population in an effort to reduce high-risk drinking behavior. College administrators have established multiple educational programs, as well as mandated drug testing, in hopes of curbing many of the substance abuse problems and associated behaviors in this population. However, the efficacy of these programs has yet to be effectively studied (Gay, Minelli, Tripp, & Keilitz, 1990; Tricker & Cook, 1988). In addition, studies need to include athletes at the club-sport team, intramural, and the National Association of Intercollegiate Athletes levels to allow a more comprehensive understanding of these issues regarding collegiate athletes.

Many challenges face researchers working with fraternity, sorority members, and student athletes, such as strong ingrained alcohol use traditions, low concern about personal drinking habits, low motivation to modify behavior, outright resistance to change, difficulty in gaining access to the populations, and various unsupported policies being implemented by institutions in an attempt to curb alcohol-related problem behavior. Regardless, these are college subpopulations that are at high risk and in need of further research attention. Studies that focus on the use of interventions, as well as continued studies on underlying themes behind higher levels of alcohol use, are needed to more clearly understand and derive appropriate interventions that impact drinking behaviors and their adverse consequences for these populations.

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TABLE 1
Percentage of Greek and Non-Greek Members Experiencing Selected Drinking-Related Consequences

Consequence	Greek membership (%)	
	Member	Nonmember
Academic Problems		
Men	35	20
Women	29	14
Blackout		
Men	44	23
Women	42	19
Taken advantage of sexually		
Men	16	8
Women	20	9
Hangover		
Men	79	57
Women	72	50

Note. Greek membership refers to a person's membership in either a fraternity or sorority. $N = 28,341$ (from 61 universities). A total of 25,411 students answered the necessary survey items from "Alcohol use in the Greek system: Follow the leader?" by J. R. Cashin, C. A. Presley, and P. W. Meilman, 1998, *Journal of Studies on Alcohol*, 59, pp. 63–70. Reprinted with permission from the author.

TABLE 2

Outcomes of Interventions That Successfully Reduced Alcohol Consumption in Members of Fraternities and Sororities (Larimer & Crounce, 2002, 2005)

Study	Participants	Conditions	Study outcomes
Baer et al. (1992)	132 heavy-drinking students	1. Alcohol skills training group	All 3 groups showed significant reductions in alcohol use.
Fournier et al. (2004)	356 attendees at fraternity parties	2. Alcohol skills training (self-help) 3. Feedback only 1. Flyer with cash incentive	Lower average blood alcohol levels at intervention parties compared with control parties.
Garvin et al. (1990)	60 fraternity members	2. Assessment-only control 1. Self-monitoring + self-management training	At the 5-month follow-up, the self-monitoring only group drank less than did all other groups. Reductions in alcohol consumption were also observed in the self-management group compared with the information and control groups.
Larimer et al. (2001)	296 fraternity & sorority pledge class members	2. Self-monitoring + information 3. Self-monitoring only 4. No-treatment control group 1. Motivational interview	Fraternity members had a significant reduction in alcohol consumption.
Marlatt et al. (1998)	348 high-risk first-year students (including fraternity members)	2. No-treatment control 1. Self-monitoring + interview incorporating personalized feedback + mailed personalized feedback (year 2) 2. Self-monitoring-only control	Individuals who received feedback showed significant reductions in drinking and negative consequences.
Thompson (1996)	169 fraternity members	1. Participation in "Deltis talking about alcohol" program 2. Assessment-only control	Larger percentage of individuals in experimental group reported a decrease in high-risk (heavy episodic) drinking compared with control participants who had an increase in high-risk drinking.