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Predictors of alcohol use during the first year of college: Implications for prevention

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Abstract

The first year of college is a unique transition period, in which the student establishes a college identity and social network. Alcohol use is often part of this process, and many first-year college students develop a pattern of heavy drinking that puts them at risk for adverse consequences during their college years and into young adulthood. To better understand the development of risky alcohol use during this transition, we reviewed the literature on influences on college drinking and identified moderators and mediators that were particularly relevant for first-year alcohol use. As the transition from high school to college presents a unique opportunity for intervention, we discuss how these moderators and mediators can inform alcohol abuse prevention programs. We also identify approaches aimed at changing the culture of alcohol use on campus. Limitations of the reviewed research are highlighted in the context of promising directions for future research.

Keywords

Alcohol; Drinking; Intervention; Prevention; College

Alcohol use by college students is common, in that more than 2 out of 3 students report drinking in the past month (Johnston, O'Malley & Bachman, 2003). Though daily drinking is quite low (5%), an estimated 31% of the 8 million college students in the U.S. meet the diagnostic criteria for alcohol abuse (Knight et al., 2002). The indicator of problem drinking that is most commonly cited is heavy episodic drinking (defined as 5 or more drinks on one occasion in the past two weeks for men; 4 or more drinks for women). Heavy drinking peaks during late adolescence and early adulthood and is especially common among 18 to 24 year-old young adults who attend college (Hingson, Heeren, Winter, & Wechsler, 2005; Schulenberg & Maggs, 2002). Overall, 42% of first-year students report one or more past-month episodes of heavy drinking, a number that has remained constant from 1993 to 2001 despite increasing prevention efforts (Wechsler et al., 2002). Significant numbers of first-year students (10–20%), especially males, consume alcohol at levels 2 or more times the heavy drinking threshold (White, Kraus, & Swartzwelder, 2006). College students often drink such large quantities of alcohol over a short time, which can result in dangerously high blood alcohol concentrations (BAC; Fournier, Ehrhart, Glindemann, & Geller, 2004). Alcohol use is also the greatest single contributor to college student morbidity and mortality, contributing to an estimated 1717 deaths among college students in 2001 (Hingson et al., 2005). Although many young adults reduce their alcohol use during their mid-twenties, a substantial proportion show a pattern of continued or escalating use into adulthood (Jackson, Sher, Gotham, & Wood, 2001; Jennison, 2004), especially men who attend college (Bingham, Shope, & Tang, 2005).

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1. First-year alcohol use

The first year at college is a unique transitional period. In the college environment, students will establish, test, and refine their new psychological identity (Scheir & Botvin, 1997). Although parents still influence college students' drinking patterns (e.g., Wood, Read, Mitchell, & Brand, 2004), freedom from day-to-day parental control is demonstrated by high rates of illegal (underage) alcohol use (Grant, Harford, & Grigson, 1988; White et al., 2006). As a result, "desires to experiment that were previously suppressed, or limited to rare occasions, may be more easily fulfilled in the new, more independent living situation" (Maggs, 1997, p. 348). Therefore, it is not surprising that first-year students often socialize in drinking contexts, and make up the largest percentage of attendees of dorm and fraternity parties (Harford, Wechsler, & Seibring, 2002). A number of studies have demonstrated that students increase their alcohol consumption during the first year of college (Bishop, Weisgram, Holleque, Lund, & Wheeler-Anderson, 2005; Capone, Wood, Borsari, & Laird, in press; Grekin & Sher, 2006; Hartzler & Fromme, 2003; Leibsohn, 1994; McCabe et al., 2005; Weitzman, Nelson, & Wechsler, 2003; White et al., 2006). In order to better understand the development of such risky alcohol use, we reviewed the research on predictors of drinking in first-year students.

A recent study provided unique insight to the alcohol use of first-year students (Del Boca, Darkes, Greenbaum, & Goldman, 2004). At the end of each month, students reported their alcohol use on each of the past 30 days using a calendar-assisted procedure. Thus, at the end of the year, the students had compiled a daily drinking record for their entire first year of college. Several findings are of interest. First, as found by others (e.g., Kidorf, Sherman, Johnson, & Bigelow, 1995; O'Malley & Johnston, 2002) men consistently consumed more alcohol than women. Second, a majority of first-year students (between 60–70% of the sample) did not report any alcohol use during any given week. However, when first-year students did drink, they tended to engage in heavy episodic drinking. In fact, approximately half of the students who drank during any specific week reported heavy episodic drinking. Third, over three-quarters of students' alcohol consumption occurred on Thursdays, Fridays, or Saturdays. Students reported very low levels of alcohol use on Sundays through Wednesdays, a pattern that is consistent with other studies that have examined first-year drinking (Hartzler & Fromme, 2003; Maggs, 1997; O'Connor & Colder, 2005). Finally, there was substantial variation in drinking rates over the course of the first year: students generally initiated heavy drinking immediately after arriving on campus, drinking rates were highest early in the semester and during holidays and university breaks, and heavy drinking moderated during midterms and finals. These results are consistent with the results of other studies (Adams & Nagoshi, 1999; Lee, Maggs, & Rankin, 2006; Maggs, 1997) and indicate that first-year drinking is influenced over the course of the semester by external events. Reports of alcohol-related problems and their correlates are not typically reported according to class year, but there is evidence that first-year students are especially vulnerable: a recent examination of 620 deaths that occurred at 4-year colleges since January 2000 revealed that first-year students account for more than a third of the deaths while only representing a quarter of the student body (Davis & De Barros, 2006a,b). Many of these deaths were related to alcohol consumption. Freshmen also are over-represented in disruptive behaviors such as getting injured or getting in trouble with the police (Harford, Wechsler, & Muthen, 2003) as well as alcohol-related emergency room visits (Bergen-Cico, 2000; Wright, Norton, Dake, Pinkston, & Slovis, 1999; Wright & Slovis, 1996).

The adoption of heavy drinking during the first year of school has longer-term implications, as many students begin a pattern of heavy drinking that often continues throughout college and young adulthood (Del Boca et al., 2004). Although college-bound individuals drink less than their non-college bound peers during high school, once in college, this trend is reversed (Grant et al., 1988; O'Malley & Johnston, 2002; Schulenberg, O'Malley, Bachman, & Johnston,

1996; Slutske et al., 2004; Slutske, 2005). Many college students “mature out” of problematic drinking upon graduation or shortly thereafter, but some maintain heavy drinking patterns into adulthood: 43% of 18–19 year old college students diagnosed with alcohol use disorder (AUD) continued to meet AUD criteria when they were 25 years old (Sher & Gotham, 1999).

2. Review of first-year alcohol use literature

To identify research on first-year use, we searched the bibliographic databases Psychinfo and Medline combining the terms *alcohol*; *college*; *student*; *freshmen*; *drinking*; and *problems*. We also used ancestry (examining bibliographies of articles) and descendancy (obtaining articles that cited other articles addressing first-year use) approaches, in addition to correspondence with researchers active in the domain (the “invisible college”; see Mullen, 1989). We also excluded studies with major design limitations (e.g., surveys with response rates well below the general acceptable standard of 60%; Dillman 1991) or inappropriate analyses (e.g., conducting regressions with multiple predictors on small samples). Manuscripts available as of December 2006 were eligible for inclusion.

This review is divided into three sections. First, to identify significant influences on alcohol use during the first year of college, we reviewed the research conducted with first-year students. To organize the number of predictors that emerged from this review, we classified predictors according to their influence on alcohol use during the first year (see Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). Thus, we defined the predictors as either moderators or mediators. Second, we link both types of predictors to specific strategies campuses can implement to reduce first-year alcohol use. Finally, we discuss the limitations of the reviewed literature, with recommendations for future research.

3. Moderators of first-year alcohol use

Moderators precede attending college and identify which students are at risk for increasing their alcohol use during their first year (Kraemer et al., 2001). Six moderators were consistently associated with drinking in first-year students: sensation seeking, race, gender, religiosity, pre-college alcohol use, and parental influences.

3.1. Sensation seeking

First-year students with high levels of sensation seeking may be at especially high risk to begin or escalate heavy drinking. Sensation seeking is a personality trait associated with strong preference for physiological arousal and novel experiences, including a willingness to take social, physical, and financial risks for arousal (Stephenson, Hoyle, Palmgreen, & Slater, 2003). For example, higher levels of sensation seeking predict heavy drinking at the onset of the first year, as well as escalations in alcohol use (Del Boca et al., 2004; White et al., 2006). Research has also implicated the closely related constructs of impulsivity, behavioral undercontrol, disinhibition, and deviancy with heavy alcohol use in first-year students (Grekin & Sher, 2006; Hair & Hampson, 2006; Ichiyama & Kruse, 1998; Moos, Moos, & Kulik, 1976; Moos, Moos, & Kulik, 1977).

3.2. Race

Large-scale surveys of college students reveals that Anglo–American students drink the most, followed by Hispanics, with African–Americans reporting the least amount of alcohol use (O'Malley & Johnston, 2002). This trend appears to be consistent for first-year students as well (Del Boca et al., 2004; Mounst, 2004; Weitzman et al., 2003). Although the intersection of race, ethnicity, acculturation, and ethnic identity with substance use has not been well studied in first-year college students, other research indicates that acculturation or ethnic identity may moderate the protective effect of race. For example, Zamboanga, Raffaelli, and Horton

(2006) studied Mexican American college students and found that males who had higher levels of ethnic identity had greater heavy drinking levels than males who had lower levels of ethnic identity. The same pattern was not true for females. Other studies have shown that greater acculturation is associated with greater substance use in Asian American college students (Hendershot, MacPherson, Myers, Carr, & Wall, 2005; So & Wong, 2006).

3.3. Gender

Research consistently indicates that male first-year students drink more often and in greater quantities than female students (Adams & Nagoshi, 1999; Baer, Kivlahan, & Marlatt, 1995; Canturbury et al., 1990; Capone et al., in press; Greenbaum, Del Boca, Wang, & Goldman, 2005; Hartzler & Fromme, 2003; Kidorf et al., 1995; Kushner, Sher, Wood, & Wood, 1994; O'Malley & Johnston, 2002). Gender differences in quantities of alcohol consumption are partially explained by sex differences in body composition, resulting in different rates of alcohol metabolism (Li, Beard, Orr, Kwo, & Ramchandani, 1998). However, in addition to the differences in overall frequency and quantity of use, men tend to engage in higher-risk drinking than women, including more heavy episodic drinking episodes (Werner & Greene, 1992; Wood et al., 2004). There are also gender differences in intentions to drink: in a comparison of planned and actual drinking, men tend to binge drink more often than originally intended, while female students binge drink less often than they had planned (Maggs, 1997). However, it is noteworthy that gender differences in heavy drinking are less pronounced in the college population (relative to same age peers) and that college men and women reach similar levels of intoxication and report similar levels of most types of alcohol problems (Ham & Hope, 2003; Perkins, 2002; White & Jackson, 2005), although men are more likely to experience aggression, property destruction, arrests, and other “public domain” consequences. There is no evidence that gender differences vary by class year; in other words, first-year students show the same gender differences as older college classes.

3.4. Religiosity

First-year students who are more religious report lower rates of alcohol use than those who value religion less and are less involved in their religious organizations (Crocker, 2002; Igra & Moos, 1979; Moos et al., 1976, 1977; White et al., 2006). For example, students who initiate drinking during their first year reported less religious involvement than students who remained abstainers (Moos, Moos, & Kulik, 1976). This finding was replicated in research examining the initiation of heavy episodic alcohol use in college freshmen — students who reported less religious involvement were more likely to start heavy drinking (Weitzman et al., 2003). Other factors appear to moderate the protective effects of religious involvement on alcohol use in first-year students. Lo and Globetti (1993) found evidence that religious involvement was no longer predictive of personal alcohol use when peer alcohol use and Greek involvement were also taken into account. One potential explanation is that the type of religiosity may differentially influence alcohol use. For example, intrinsic religiosity (e.g., living one's life according to religious beliefs) is a better predictor of alcohol use than other religious predictors (e.g., attending church to make or see friends) (Galen & Rogers, 2004). Therefore, the depth of personal religious commitment may be a better predictor of alcohol use than measures of religious involvement.

3.5. Pre-college alcohol use

A high level of pre-matriculation drinking consistently predicts first-year alcohol use (Grekin & Sher, 2006; Hartzler & Fromme, 2003; Read, Wood, Davidoff, McLacken, & Campbell, 2002; Reifman & Watson, 2003). A large percentage of freshmen come to college with established drinking patterns which are generally maintained or increased during the first year at school (Baer et al., 1995; Deacon & Cohen, 1986; Lau, Quadrel, & Hartman, 1990; Reifman

& Watson, 2003; Wood et al., 2004). For example, Baer et al. identified a cluster of students who were risky drinkers (defined as drinking 5–6 drinks on one occasion in the past month or experiencing 3 or more problems in the past 3 years) in high school and increased their frequency, quantity and peak alcohol use following the transition to college (Baer et al., 1995). Many students who were light drinkers and abstainers in high school also increase their drinking after matriculation. Specifically, between 40–50% of students who enter college as non-drinkers start drinking during their freshman year (Lo & Globetti, 1993; Moos et al., 1976), and 25% of students who did not engage in heavy episodic drinking adopted this style of use during their first year (Weitzman et al., 2003). Living arrangements may influence this increase: roommates who both engaged in heavy episodic drinking in high school are at particular risk for increasing their alcohol use during their first year (Duncan, Biosjoly, Kremer, Levy, & Eccles, 2005).

3.6. Parental influences

Although entrance into college is generally associated with increased autonomy, parents continue to influence their children's drinking patterns (Barnes & Farrell, 1992; Sessa, 2005; Turrise, Wiersma, & Hughes, 2000; Turrise, Jaccard, Taki, Dunham, & Grimes, 2001; Windle, 2000). Parents can influence their children's substance use through overt modeling, advising against experimentation, instituting clear consequences for alcohol use, modifying substance abuse beliefs, and affecting peer selection (Johnson & Johnson, 2001). Indeed, college students' drinking attitudes and behaviors are correlated with parental attitudes and behaviors, especially during the first two years on campus (Sessa, 2005; Standing & Nicholson, 1989). In addition, students who talk to their mothers about drinking show less positive beliefs about drinking consequences (Jaccard & Turrise, 1999; Turrise, Padilla, & Wiersma, 2000). Strong parental influence can even mitigate the impact of peer heavy drinking on young adults' alcohol use and problems (White et al., 2006; Wood et al., 2004).

Surveys that have examined the role of parental influence on first-year alcohol use suggest that the quality of parent and child relationships, especially the father–son relationship, at college entrance are negatively related to alcohol-related consequences in first-year students, (Turner, Larimer, & Sarason, 2000). Furthermore, first-year students who report greater levels of parental approval for drinking (especially that of the mother) are more likely to experience negative consequences from alcohol use (Boyle & Boekeloo, 2006). Parental monitoring (e.g., knowing what their children did when they went out) and disapproval of alcohol use are also negatively associated with alcohol use and consequences, and parental permissiveness (e.g., how many drinks per occasion the parent viewed as an upper limit) is positively associated with alcohol use and consequences among first-year students (Wood et al., 2004). In this latter study, permissiveness was also found to moderate the relationships between peer influences (e.g., active offers of alcohol use, social modeling of drinking, perceived peer norms) and alcohol use and consequences. In other words, peer influences were less potent for the students whose parents set more stringent drinking limits. Therefore, even when the student is at college, parents exert and influence on their children's drinking decisions and moderate peer influences.

4. Mediators of first-year alcohol use

Mediators explain how or why entering college affects first-year alcohol use. Therefore, the mediator must occur after college entrance but before alcohol use increases during the first year. Our review identified six mediators of first-year alcohol use: coping, alcohol expectancies, drinking motives, perceived norms, Greek membership, and drinking game participation.

4.1. Coping

Alcohol use may be one of the ways that first-year students cope with the stressors or negative emotions experienced during their first year on campus. O'Connor and Colder (2005) examined the relationship between sensitivity to reward (one's response to the positive effects of alcohol), coping reasons for drinking (e.g., to forget about your worries), and heavy alcohol use in first-year students. Results indicated that endorsing coping reasons for drinking mediated the relationship between sensitivity to the rewards of alcohol and heavy alcohol use. Therefore, it is possible that students who lack appropriate coping skills may view alcohol as a way to attenuate their unpleasant emotions or cognitions (e.g., depression, anxiety). This relationship is consistent with other research linking unpleasant emotions and heavy alcohol use during the first year in college. Specifically, heavy episodic drinkers are more likely to drink to cope with "emotional pain" than lighter drinkers (Ichiyama & Kruse, 1998) and negative self image is positively related to heavy alcohol use in first-year students (Maggs, 1997). Other research indicates that the relationship between alcohol use and coping may be particularly relevant during the first year. Rutledge and Sher (2001) found a significant positive relationship between stress (defined as negative life events) and alcohol use in first-year students. By the time the students were seniors, however, the relationship was only significant for men. Therefore, using alcohol to cope with stress may be common among all first-year students, but over time women may develop alternate ways of coping, perhaps utilizing social support (e.g., Hays & Oxley, 1986).

4.2. Alcohol expectancies

Alcohol expectancies are beliefs about the cognitive, affective or behavioral effects of alcohol use and can be both positive (e.g. drinking allows me to relax around others) and negative (e.g. when I drink, I often say things that I regret later). Expectancies of tension reduction (e.g., drinking helps me relax when I'm tense)(Kushner et al., 1994), disinhibition (e.g., Drinking makes me do things that I wouldn't normally do) (Adams & Nagoshi, 1999), social assertiveness (e.g., when I am drinking, it is easier to open up and express my feelings) and global positive changes (e.g., drinking can make me more satisfied with myself) (Kidorf et al., 1995), and physical and social pleasure (e.g., drinking makes me feel good) (Greenbaum et al., 2005; Reifman & Watson, 2003; Werner & Greene, 1992) have consistently been associated with alcohol use in first-year students. In fact, expectancies are generally the most robust predictor of increases in alcohol use during the first year (Del Boca et al., 2004; Greenbaum et al., 2005).

4.3. Drinking motives

Drinking motives refer to student's identified reasons for drinking (see Kuntsche, Knibbe, Gmel, & Engels, 2005). First-year students often cite social facilitation, a sense of belonging, and "fitting in" as important motives for drinking (Ichiyama & Kruse, 1998; Igra & Moos, 1979; Johnson, Rodger, Harris, Edmunds, & Wakabayashi, 2005). Indeed, viewing alcohol use as a way to facilitate socialization is significantly associated with intentions to drink during the first year in college (Rimal & Real, 2005). Men who have a strong desire for affiliation tend to drink heavily during the first year (Hartzler & Fromme, 2003), and students who start to binge drink in college are more likely to endorse "fitting in" and "because everyone else does" as a motive for drinking than students who do not start to binge drink (Weitzman, Folkman, Folkman, & Wechsler, 2003). The importance of parties and supportive social interaction have also been linked to heavy drinking among freshmen (Reifman & Watson, 2003; Hartzler & Fromme, 2003; Moos et al., 1976), and heavy drinkers are more likely to endorse drinking as a way to make friends and to be popular during freshman year (Maggs, 1997) than lighter drinkers. The perception of drinking being associated with popularity is not

unfounded: having high levels of peer acceptance during the first year at school has been linked to heavy drinking (Maggs, 1997).

4.4. Perceived norms

Both descriptive and injunctive norms are related to college drinking. *Descriptive norms* refer to the perception of other's quantity and frequency of drinking, and are based largely on observations of drinking in discrete drinking situations. *Injunctive norms* refer to the perceived approval of or attitudes about drinking. Research indicates that injunctive norms influence personal judgments concerning the acceptability of behaviors; specifically, the individual is more likely to engage in behaviors perceived to be approved of by others (Cialdini, Kallgren, & Reno, 1991). Students also tend to overestimate both descriptive and injunctive norms; that is, students often believe that peers drink more than they do and that peers are more approving of alcohol use than they really are (Borsari & Carey, 2001, 2003). As a result of this environment perceived to be supportive of heavy drinking, the individual may feel pressure to drink heavily.

Perceived norms may be particularly influential during the first year. In a study comparing freshmen and upperclassmen, Turrisi, Padilla, and Wiersma (2000) found that the influence of peer norms to be strongest during the first year at school. This may result from new students relying on their perceptions of other students' behaviors to guide their own. Peer friendships are vital in this process, as they provide the first-year student with role models, validations, and socialization opportunities that promote the adoption of a new college student identity (Hays & Oxley, 1986). Research indicates that the overestimation of norms appears early during the first year, and norms increase as personal use increases (Hartzler & Fromme, 2003). Furthermore, perceived injunctive and descriptive norms are also significantly correlated with personal alcohol use throughout the first year (Baer, 1994; Hartzler & Fromme, 2003; Perkins & Craig, 2006; Read et al., 2002; Werner, Walker, & Greene, 1992; Wood et al., 2004). Therefore, overestimating peers' drinking rates and approval of drinking may be important risk factors for heavy drinking among first-year students.

4.5. Greek membership

Greek involvement has shown consistent associations with heavy alcohol use (Borsari & Carey, 1999; Brennan, Walfish, & AuBuchon, 1986; Cashin, Presley, & Meilman, 1998). Compared to other students, Greek members have more drinking problems (Faulkner, Alcorn, & Garvin, 1989; Lichtenfield & Kayson, 1994) and endorse more tolerant views on alcohol consumption (Klein, 1992). Leaders in the Greek system are often the heaviest drinkers on campus and are also more likely than non-members to see alcohol use as a vehicle for friendship and social activity (Cashin et al., 1998). Greeks report having a larger network of friends than non-Greeks, and the frequency of interacting with friends is significantly related to excessive alcohol use (even after accounting for Greek status; Dorsey, Sherer & Real, 1999).

Greek involvement is associated with heavy drinking in first-year students, especially men (Bartholow, Sher, & Krull, 2003; Capone et al., in press; Grekin & Sher, 2006; Kahler, Read, Wood, & Palfai, 2003; McCabe et al., 2005; Werner & Greene, 1992). Both selection (choosing to join the Greek system) and socialization (the influence of the Greek environment) both appear to contribute to this phenomenon (Grekin & Sher, 2006). Heavier drinkers in high school are more likely to join a fraternity than moderate or non-drinkers during their first year (Baer et al., 1995; Capone et al., in press; Schall, Kemeny, & Maltzman, 1992), especially those with high-risk drinking behaviors such as heavy episodic drinking (Canterbury et al., 1990; McCabe et al., 2005). Students often increase their alcohol use once entering the Greek system. For example, students who enter college as low frequency drinkers (consuming less than 6 drinks per occasion) are three times more likely to start drinking heavily (6 or more drinks) if they

join a fraternity (Lo & Globetti, 1995). Even students who are heavy drinkers before joining the Greek system display an increase in symptoms of alcohol dependence (Capone et al., in press; Grekin & Sher, 2006). The influence of socialization is further indicated by the decrease in drinking observed in students who disengage from the Greek system (McCabe et al., 2005).

The influence of the Greek system of the alcohol use of first-year students is especially prominent during the initiation or “pledge” period. During this time fraternities and sororities systematically limit the social contact pledges can have with non-members, and force them to form tight, intimate groups (Arthur, 1997; Sweet, 1999). The pledge must learn house rituals, demonstrate loyalty to fellow members, and earn a place in the organization. To do so, pledges must bond with fellow pledges and current members, and failure to do so can result in rejection. Alcohol is frequently used during pledge period to foster bonding (Kuh & Arnold, 1993), especially in fraternities, as fraternity pledges drink four times as much as sorority pledges (Schall et al., 1992).

4.6. Drinking game participation

Drinking games have become increasingly popular on college campuses (Gettleman, 2005). There are over 500 different drinking games played on college campuses, all having the common goal of getting the participants intoxicated (see Borsari, 2004 for a review). Games may involve verbal skills (e.g., tongue twisters), physical ability (e.g., beer pong), or group activities (drinking whenever a certain phrase or word is mentioned in a song or television show). Recent surveys estimate that 50% to 62% of college students have played drinking games in the past month (Johnson, Wendel, & Hamilton, 1998; Nagoshi, Cote, Wood, & Abbit, 1994). Drinking games are consistently associated with greater frequency and quantity of drinking as well as alcohol-related problems (Adams & Nagoshi, 1999; Engs & Hanson, 1993; Johnson & Cropsey, 2000; Johnson et al., 1998; Nagoshi et al., 1994; Zamboanga, Leitkowski, Rodriguez, & Cascio, 2006). Women are also at particular risk of sexual victimization following drinking game participation (Johnston & Stahl, 2004).

Many first-year students arrive at school with experience playing drinking games. In a survey of over 1200 incoming first-year students, Borsari, Bergen-Cico, and Carey (2003) found that over half (63%) had played drinking games in their lifetime and viewed them as a means to get drunk quickly, socialize, and control others or get someone else drunk. Adams and Nagoshi (1999) found that over the course of the semester, changes in the frequency of drinking game participation predicted changes in alcohol use. The more students played drinking games, the more alcohol they consumed. This relationship between alcohol use and drinking games was not evident in older students, suggesting that first-year students may initially drink heavily in the context of drinking games, and then moderate their participation.

5. Prevention implications related to identified moderators of first-year drinking

5.1. Screening

Table 1 provides a summary of the moderators of first-year alcohol use and their prevention implications. While the moderators are not changeable in the context of an intervention, they can be used to identify incoming students who are at greatest risk for alcohol problems. Although a variety of screening tools have been developed to detect problematic alcohol use in college students (Larimer, Cronce, Lee, & Kilmer, 2004/2005), simply screening all incoming students for risk factors raises both practical and ethical issues. Instead, a strategic screening may be most appropriate. First-year students come into contact with the school administration in a variety of ways, such as experiencing academic difficulties, referral to the

administration for alcohol violations, or presenting to the counseling center for treatment. Students can be screened at these times, and these moderators can identify the students who would benefit from indicated preventions which target individuals who have detectable signs of problem drinking (see Mrazek & Haggerty, 1994). For example, Caucasian men reporting high levels of sensation seeking and a history of drinking prior to college are at high risk for heavy drinking during their first year. Students with this profile may benefit from supportive services that can address their drinking, such as education, outreach, and/or interventions related to alcohol misuse (see Larimer & Cronce, 2002). In this way, first-year students who are at particular risk may be able to receive attention before their drinking worsens. That said, it will be a challenge to develop screening and referral procedures that appeal to students, maintain confidentiality, and avoid creating disincentives to accurate reporting.

5.2. Internet screening and intervention

Over the past several years web-based alcohol intervention programs (or e-Interventions) have proliferated (see Walters, Miller, & Chiauuzi, 2005 for a detailed description). E-Interventions are likely less expensive than in-person programs, can provide a degree of confidentiality, and offer a relatively simple way to collect information about student alcohol use and related risks. As students could complete the surveys on-line, these programs could serve as an efficient screening tool for identifying high-risk first-year students. However, these programs are not currently used for screening: instead, they have been implemented to reduce high-risk alcohol use in college students.

E-Interventions provide information about alcohol and health, risk factors, and tips to reduce drinking. Many also provide personalized feedback similar to in-person or mailed interventions (Walters & Neighbors, 2005), so they have some empirical basis for their components. E-Interventions vary in the number of modules, and typically take between 1–6 hours to complete. To date, some e-Interventions have been linked to increases in knowledge regarding alcohol and its effects, increased intent to reduce drinking, as well as actual reductions in alcohol use and problems (Bersamin, Paschall, Fearnow-Kenney, & Wyrick, in press; Chiauuzi, Green, Lord, Thum, & Goldstein, 2005; Wall, 2006; Walters, Vader, & Harris, in press). However, the few published trials of e-Interventions lack good enrollment and follow-up rates, random assignment to condition, the inclusion of a control condition, and measurement of behavioral outcomes beyond a few months. Therefore, more research is needed to determine the efficacy of e-Interventions.

5.3. Parental interventions

As described in Section 3.6, parents have considerable influence on the alcohol use of first-year students and there is evidence that involving parents in interventions addressing alcohol use may reduce risky drinking in first-year students. Turrisi et al. (2001) designed a preventive intervention for incoming freshmen that provides parents with a guide book for recognizing and preventing alcohol misuse by their teen. The intervention booklet includes modules on prevalence and consequences of college heavy drinking, information on the physiological, psychological, and psychomotor effects of alcohol, risk and protective factors for college drinking, and identifying problem drinking in young adults. The booklet also provides parents with strategies for improving communications with their child, information about how to teach their child's assertiveness and drink refusal skills, and how to intervene if their child develops a drinking problem (Turrisi et al., 2001). A clinical trial conducted with college-bound high school seniors the summer before matriculation to college compared the parent intervention to an assessment only condition. At the end of their first semester, the treatment group showed significantly lower drinking levels, episodes of drunkenness, and alcohol problems compared to a demographically matched control group.

Although results should be interpreted cautiously because participants were not randomly assigned to condition nor assessed prior to the intervention, this study does suggest that parent interventions targeting their young adult children's drinking are feasible and appealing to parents, and may be an effective way to reduce drinking and alcohol problems. Unlike traditional family therapy interventions, which require multiple therapy sessions and highly trained therapists, the intervention developed by Turrisi does not require direct clinical contact and therefore has the potential to be widely implemented as a prevention strategy for young adult drinking. In addition to this intervention, other materials have been developed to educate parents about this risks of alcohol use on campus, as well as factors to consider when selecting a school (e.g., presence of Greek system, alcohol policies)(National Institute on Alcohol Abuse and Alcoholism, 2002a). These materials could be mailed to the parents of matriculating students, or emphasized during orientation.

6. Prevention implications related to identified mediators of first-year drinking

6.1. Brief motivational interventions

As the influence of the mediators becomes prominent after the student arrives on campus, they may be more amenable to change than the moderators. Therefore, as indicated in Table 1, these mediators could be addressed in the context of one or two session brief motivational interventions (BMIs). BMIs are typically delivered using the style of motivational interviewing (MI), a supportive and nonjudgmental therapeutic approach that is specifically designed to work through the ambivalence that often accompanies health behavior change (Miller & Rollnick, 2002). The feedback content has varied somewhat across studies, but generally includes objective information on alcohol use and related consequences, (e.g., financial expenditures, caloric content of alcohol, impact of drinking on academics) that is intended to generate dissonance regarding the student's current pattern of heavy drinking. Information about how the student compares to other students may correct overestimates of peer drinking, and feedback on risk factors (e.g., family history of alcohol problems) can help students evaluate their risk levels and promote consideration of behavior change.

Drinking reductions have been associated with a number of BMI formats including individual and group counseling/educational sessions (reviewed by Larimer et al., 2004/2005). Because college student drinkers generally report mild to moderate drinking problems and little motivation to change their drinking, they are an ideal population to target with BMIs that can be delivered opportunistically and require minimal burden on the part of the student or the university (Larimer et al., 2004/2005). The primary goal of BMIs with college students is to reduce alcohol-related harmful consequences by encouraging students to moderate consumption and avoiding high-risk behaviors associated with drinking (e.g., fights, risky sex, driving). Given the rapid acquisition and escalation of heavy drinking during freshman year (Hartzler and Fromme, 2003), the entrance to college is an ideal juncture for a BMI. Importantly, Marlatt et al. (1998) demonstrated the feasibility of assessing and treating large numbers of first-year college students. These students were defined as "at-risk", as they reported binge drinking and/or problems with alcohol use prior to matriculation. Four-year follow-ups revealed significant reductions in drinking rates and problems associated with alcohol use in the brief intervention group, relative to its own baseline as well as the assessment-only condition (Baer, Kivlahan, Blume, Mcknight, & Marlatt, 2001). This research project produced a manual how to conduct individual BMIs on campus, Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999), which has been widely implemented on college campuses. In addition, promising preliminary results have been obtained with group BMIs implemented specifically targeting first-year students (LaBrie, Pedersen, Lamb, & Bove, 2006; Michael, Curtin, Kirkley, Jones, & Harris, 2006).

Thus, there is ample support for the recommendation that colleges and universities implement similar BMI programs for first-year students, perhaps redirecting resources from educational programs that have not demonstrated efficacy.

A consistent finding across BMI formats is that interventions that include personalized drinking feedback are more effective than interventions that provide only generic information about alcohol (Larimer & Crouce, 2002; Murphy et al., 2001; Neighbors, Larimer, & Lewis, 2004; Walters & Neighbors, 2005; Walters & Baer, 2006). As indicated in Table 1, it is possible that BMIs could address other mediators such as alcohol expectancies (e.g., Borsari & Carey, 2000), perceived norms (e.g., Neighbors et al., 2004), and drinking game participation (Borsari & Carey, 2000, 2005).

6.2. Social norms marketing campaigns

Social norms marketing campaigns (SNM) have received a great deal of attention in the past 10 years (see Perkins, 2003). This approach posits that heavy drinking in students is influenced by their misperception of other students' drinking. Therefore, using mass media campaigns (posters, flyers, emails, newspaper ads) to correct the misperceptions of the campus drinking norm (e.g., "65% of University × students drink four or fewer drinks when they party") will reduce on-campus alcohol use. Regarding the effectiveness of this approach, some research indicating that it leads to more accurate perceptions of the campus norm as well as reductions in personal alcohol use (Haines & Spear, 1996; Perkins & Craig, 2006) while other research indicates such marketing campaigns has little or no effect (Campo & Cameron, 2006; Clapp, Lange, Russell, Shillington, & Voas, 2003; Thombs & Hamilton, 2002; Wechsler et al., 2003).

Social norms marketing campaigns have typically been conducted on single campuses and did not involve randomization of participants. A recent multi-site study provides the most stringent evaluation of the social norms approach to date (DeJong et al., 2006). This trial randomly assigned 18 different campuses to receive or not receive an SNM. The nine campuses that received SNM campaigns were carefully monitored to ensure equivalent implementation across sites (e.g., intensive staff training, guidebooks, frequent contact with campus staff, regular progress reports). Campaigns were conducted for three academic years. Results indicated that campuses that received an SNM campaign reported more accurate perceptions of the campus norm as well as small reductions in personal alcohol use than those campuses that did not receive an SNM campaign (whose students' alcohol use actually increased). Therefore, it appears that SNM campaigns can be an effective component of campus efforts to reduce heavy drinking among first-year students, especially if implemented when the students arrive on campus.

7. The larger context: Changing the culture of college drinking

The moderators and mediators of first-year use do not occur in isolation. Instead, they are part of an overall culture of alcohol use on campus. Indeed, the culturally entrenched perception of college as a place for "late adolescent pleasure as much as a place for formal education" (Moffat, 1991, p. 59) may pose the most significant barrier to effective prevention efforts (Wechsler & Wuethrich, 2002). Alcohol has long been viewed as a vital part of college social life and is often present at student social functions, alumni events, and campus athletic events (Rimal & Real, 2005; Thombs, 1999). Compared to nondrinkers, student drinkers have more friends (Moffat, 1991), are rated as popular by peers, and may epitomize success in the "sociosexual college subculture", which includes partying, taking part in leisurely activities and sports, and pursuing romantic relationships (Ashmore, Del Boca, & Beebe, 2002, p. 887). The media contributes to this perception by frequently depicting college students as heavy drinkers in films (e.g., *Animal House*, *Old School*) and headlines describing spring break and

other alcohol focused student events. Thus, the cultural stereotype of the heavy drinking college student perpetuates the expectation that college is a place to drink excessively before assuming the responsibilities of adulthood (Moffat, 1991). Indeed, 7th through 12th graders perceive heavy alcohol use to be the norm among college students, a perception that is most pronounced among students who are heavy drinkers themselves (Thombs, Olds, & Ray-Tomasek, 2001). Thus far, the mediators and moderators have been discussed in the context of prevention and intervention programs. While these may change alcohol use on an individual basis, there is clearly a need for environmental interventions to address the culture of alcohol use on college campuses (Table 1).

7.1. Decreasing the availability and increasing the price of alcohol

Although on a broader scale than the moderators and mediators discussed in this review, there are environmental approaches that could limit first-year alcohol use. Recent data demonstrates that the high density of alcohol outlets and ample access to low-cost alcohol is associated with heavy drinking in undergraduates (Kuo, Wechsler, Greenberg, & Lee, 2003; Weitzman et al., 2003), and students who report that it is easy for them to obtain alcohol tend to be heavy drinkers (Wechsler, Kuo, Lee, & Dowdall, 2000).

Given the connection between access to alcohol and heavy drinking, methods for restricting access to alcohol may alter the culture of college drinking. Specifically, a National Institute on Alcohol Abuse and Alcoholism panel (2002b) recommended a number of environmental strategies aimed at reducing the availability and increasing the price of alcohol, including banning the use of alcohol on campuses, prohibiting kegs, increasing alcohol server-training, increasing the cost of liquor licenses, limiting days and hours of alcohol sales, limiting container size, and increasing state alcohol taxes (see DeJong & Langford, 2002; Toomey & Wagenaar, 2002). Other strategies may increase the availability of alcohol for first-year students. In light of the finding that college students' demand for alcohol is extremely price sensitive (Murphy & MacKillop, 2006), alcohol prevention policies should seek to eliminate drink specials and increase drink prices. As many first-year students do not have automobiles and live in campus residence halls, these changes would be most effective in bars on and within walking distance of campus.

7.2. Enforcement of campus alcohol policies and minimal drinking age law

Another way to reduce drinking in first-year students is to enforce the minimum drinking age law and establish clear sanctions against alcohol use (Wagenaar & Toomey, 2002; Wechsler, Seibring, Liu, & Ahl, 2004). School administrations need to project a consistent message regarding the acceptability of alcohol use on campus. Currently, many students are told that alcohol is not permitted on campus, yet observe lax enforcement of school policy in their dorms or at social functions. Such contradictory policies permit heavy drinking (e.g., drinking games) to proliferate.

Because most first-year students are under 21 years old, the 21 and over legal drinking law may be the most important sanction against drinking. However, college administrators must ensure that this law is enforced on campus, and local police must ensure that there are appropriately stringent sanctions against establishments that serve alcohol to minors. The fact that underage drinkers account for 19.7% of all alcohol consumed in the U.S., and 22.5 billion in alcohol expenditures (Foster, Vaughan, Foster, & Califano, 2003), suggests that legal drinking limits are not well enforced and that underage drinkers are an important market for the alcohol beverage industry (see Wechsler & Wuethrich, 2002). Campus enforcement is also required to ensure that first-year students are not consuming alcohol purchased by older students (Kuo et al., 2003). Therefore, clearly stating and consistently enforcing alcohol policies may reduce alcohol use in first-year students.

7.3. Increase academic demands and volunteer work

Reducing alcohol consumption in first-year students can also be accomplished by increasing the natural negative consequences associated with substance use (DeJong & Langford, 2002; Toomey & Wagenaar, 2002). This might be accomplished by increasing the general work demands required of first-year college students (e.g., increasing mandatory class time, study hours, or community service). Most college students attend class only for approximately 15 hours per week, leaving them with an excessive amount of unstructured free time (Moffat, 1991). Free time is a risk factor for heavy drinking (Wechsler, Dowdall, Davenport, & Castillo, 1995) and may enable many college students to drink heavily with little negative impact on their academic performance (Paschall & Freisthler, 2003; Wood, Sher, & McGowan, 2000). Reducing the amount of free time available to first-year students would make it more difficult to drink heavily without infringing upon academic or other demands. Indeed, first-year drinking levels are highest when academic demands are low (i.e., early in the semester and during semester breaks) and lowest when academic demands are high (i.e. during finals; Del Boca et al., 2004; Moffat, 1991). Furthermore, data from a national sample of 17,592 college students indicates that students who volunteer are at lower risk for binge drinking (Weitzman & Kawachi, 2000).

Although altering students' academic and community service requirements would be challenging, there are also relatively easily implemented strategies that might reduce unstructured leisure time, such as teaching students time management and study skills, increasing contingencies on class attendance (e.g., pop quizzes, penalties for unexcused absences, etc.), and increasing morning class offerings (especially on Fridays) and requirements for internship and service-learning experiences. For example, one study found that students with early classes on Friday morning drank significantly less on Thursday nights than students with later class times, even after the authors controlled for high school alcohol consumption, GPA, and ACT score (Wood, Sher, & Rutledge, 2005).

7.4. Increased adult presence in living environments

The majority of freshmen live in residence halls, a common location for parties involving alcohol (Boyd, McCabe, & d'Arcy, 2004). Thus, supervision of first-year students in their residences may be an important component of reducing risky alcohol use. Policies of having dorm "mothers" or "fathers", adults who resided in the dorms and supervised the students, were discontinued in the 1960's. Instead, the responsibility of supervising first-year students has fallen to fellow students who are usually a year or two older. Although same-aged counselors can influence alcohol use (e.g., Larimer et al., 2001), older supervisors may be better able to provide positive modeling and guidance. For example, some schools have replaced dorm mothers and fathers with professional live-in residence hall staff members who have master's degrees in college student development or higher education administration. Professional residence hall staff could provide an important conduit to student counseling, alcohol education programs, academic support programs, other campus service providers. This may influence the moderators and mediators on personal alcohol use. For example, professional staff may serve as a proxy for the parental influence, or may provide help to students who are using alcohol to cope with the stresses of college life. By influencing entire dormitories of first-year students at once, a stronger adult presence on campus may foster more of a sense of accountability and responsibility.

7.5. Increasing alternatives to alcohol use

Social integration is a primary goal of first-year students (Christie & Dinham, 1991) and alcohol is often used to facilitate that goal (Murphy, Barnett, & Colby, 2006). Indeed, many of the mediators (motives, expectancies, perceived norms, and the Greek system) of alcohol use are directly related to socialization. To lessen the role of alcohol in college socialization, a National

Institute of Alcohol Abuse and Alcoholism panel recommended that colleges encourage alternative social/recreational activities by providing alcohol-free coffeehouses and movies and expanded hours for student centers and gyms, and by incorporating service learning and community service into the academic curriculum (DeJong & Langford, 2002). Because most college drinking occurs in the evenings and in social contexts, it is especially important to devise evening social activities (Murphy et al., 2006). It may be particularly challenging to devise alcohol-free social options for college men, who are less likely to socialize when they are not drinking and report lower overall enjoyment from alcohol-free activities than women (Murphy et al., 2006). These tendencies may be indicative of important gender differences in the role of alcohol in socialization and suggest that men may require different interventions or specific substitute activities (see Borsari & Carey, 2006).

Although future research will need to identify effective programs for increasing engagement in alcohol-free activities, recent studies suggesting that students who successfully reduce their drinking following an intervention report increases in alternative activities (Murphy, Correia, Colby, & Vuchinich, 2005). Furthermore, reported enjoyment from recent substance-free activities is positively associated with motivation to change alcohol use among identified problem drinkers (Murphy, Barnett, Goldstein, & Colby, in press), and increasing engagement in alternative activities is associated with reduced alcohol use (Correia, Benson, & Carey, 2005). Therefore, emerging research can attest to the importance of including alcohol-free activities as a component of comprehensive prevention programs.

In sum, efforts to change the campus culture of drinking should facilitate first-year students' social transition to college through structured activities that allow students to make friends within alcohol-free contexts. This may lessen the influence of the socially-oriented mediators. For example, with a number of alcohol-free socialization opportunities available, students may be less motivated to drink in order to meet others. It will be especially important to implement these interventions during the first few weeks of school in order to create patterns of interactions that do not involve alcohol. First-year men will be important targets of these interventions. In this way, campuses may challenge the common perception among first-year students that drinking is the best way to facilitate peer socialization.

8. Limitations/future research directions

The limitations of the reviewed studies suggest several promising areas of future research. Almost all of the studies reviewed here employed cross-sectional designs, making it impossible to examine changes over time. Future longitudinal research, preferably starting data collection before students arrive on campus, will be able to identify the moderators and mediators that are most associated with risky drinking. Longitudinal examination of the etiology of college alcohol use will permit three important avenues of research. First, as the influence of the mediators and moderators may fluctuate over time, longitudinal research will facilitate a better understanding of the window of influence for specific risk and protective factors. For example, research indicates that coping appears to influence first-year alcohol use; however, this relationship becomes less potent for women as time passes (Rutledge & Sher, 2001). Second, the mediators and moderators of first-year use have been examined in relative isolation. Longitudinal research using multi-level modeling approaches (MLM; Singer & Willet, 2003) would allow researchers to evaluate several predictors at once in order to determine their individual and combined effects. In this way, predictors of first-year alcohol use could be reclassified as proxy, overlapping, or independent (see Kraemer et al., 2001). Third, little research has been done to establish true mediation of intervention outcomes with college students; that is, examining whether change in the mediator precedes change in the outcome of interest. For example, reductions in perceived norms have been found to mediate reductions in alcohol use following a BMI with college students (Borsari & Carey, 2000). However, it

remains to be seen which other mediators are effective in the context of a BMI. To do so, researchers must identify the mediators that are both related to alcohol use and amenable to change. Furthermore, the timing of the assessments is vital — mediators should be measured before and after the intervention, and before the outcomes (see Kraemer et al., 2001). Better understanding of the mediators could lead to more effective alcohol interventions for first-year students. Future research can also adopt an evidence based approach to designing alternative activities, as is done with secondary prevention work. Systematic evaluation of alternatives (e.g., assessing how many students attend, changes in alcohol-related incident rates on the night of events) would allow campuses to improve and refine the alternatives they provide their students. In addition, a thorough cost-benefit analysis of the variety of interventions provided to students would allow campuses to determine the best allocation of their resources.

In sum, a variety of moderators and mediators are predictive of first-year alcohol use, indicating the complexity of what has become a significant problem on college campuses. Fortunately, these moderators and mediators can be used to inform a variety of interventions. In addition, the implementation of campus-wide policy initiatives may also change the availability and costs of consuming alcohol. Together, the approaches outlined in Table 1 may change the culture of drinking on college campuses. Although policy changes may be met with initial resistance and defiance (Kilmer, Larimer, Parks, Dimeff, & Marlatt, 1999), the entire student body is renewed every four years, creating new opportunities to cultivate a climate that discourages heavy drinking.

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References

- Adams CE, Nagoshi CT. Changeover one semester in drinking game playing and alcohol use and problems in a college student sample. *Substance Abuse* 1999;20:97–106. [PubMed: 12511824]
- Arthur LB. Role salience, role embracement, and the symbolic self-completion of sorority pledges. *Sociological Inquiry* 1997;67:364–379.
- Ashmore RD, Del Boca FK, Beebe M. “Alkie”, “Frat Brother”, and “jock”: Perceived types of college students and stereotypes about drinking. *Journal of Applied Social Psychology* 2002;32:885–907.
- Baer JS. Effects of college residence on perceived norms for alcohol consumption: An examination of the first year in college. *Psychology of Addictive Behaviors* 1994;8:43–50.
- Baer JS, Kivlahan DR, Marlatt GA. High-risk drinking across the transition from high school to college. *Alcoholism, Clinical and Experimental Research* 1995;19:54–61.
- Baer JS, Kivlahan DR, Blume AW, McKnight P, Marlatt GA. Brief intervention for heavy-drinking college students: 4-year follow-up and natural history. *American Journal of Public Health* 2001;91:1310–1316. [PubMed: 11499124]
- Barnes GM, Farrell MP. Parental support and control as predictors of adolescent drinking, delinquency, and related problem behaviors. *Journal of Marriage and the Family* 1992;54:763–776.
- Bartholow BD, Sher KJ, Krull JL. Changes in heavy drinking over the third decade of life as a function of collegiate fraternity and sorority involvement: A prospective, multilevel analysis. *Health Psychology* 2003;22:616–626. [PubMed: 14640859]
- Bergen-Cico D. Patterns of substance abuse and attrition among first year students. *Journal of the First Year Experience* 2000;12:61–75.
- Bersamin M, Paschall MJ, Fearnow-Kenney M, Wyrick D. Effectiveness of a web-based alcohol misuse and harm prevention course (College Alc) among high- and low-risk students. *Journal of American College Health*. in press
- Bingham CR, Shope JT, Tang X. Drinking behavior from high school to young adulthood: Differences by college education. *Alcoholism, Clinical and Experimental Research* 2005;29:2170–2180.

- Bishop DI, Weisgram ES, Holleque KM, Lund KE, Wheeler-Anderson JR. Identity development and alcohol consumption: Current and retrospective self-reports by college students. *Journal of Adolescence* 2005;28:523–533. [PubMed: 16022886]
- Borsari B. Drinking games in the college environment: A review. *Journal of Alcohol and Drug Education* 2004;48:29–51.
- Borsari BE, Carey KB. Understanding fraternity drinking: Five recurring themes in the literature, 1980–1998. *Journal of American College Health* 1999;48:30–37. [PubMed: 10485163]
- Borsari B, Carey KB. Effects of a brief motivational intervention with college student drinkers. *Journal of Consulting and Clinical Psychology* 2000;68:728–733. [PubMed: 10965648]
- Borsari B, Carey KB. Peer influences on college drinking: A review of the research. *Journal of Substance Abuse* 2001;13/14:391–424. [PubMed: 11775073]
- Borsari B, Carey KB. Descriptive and injunctive norms in college drinking: A meta-analytic integration. *Journal of Studies on Alcohol* 2003;64:331–341. [PubMed: 12817821]
- Borsari B, Carey KB. Two brief alcohol interventions for mandated college students. *Psychology of Addictive Behaviors* 2005;19:296–302. [PubMed: 16187809]
- Borsari B, Carey KB. Influence of the quality of peer relationships on college drinking. *Drug and Alcohol Review* 2006;25:361–370. [PubMed: 16854663]
- Borsari B, Bergen-Cico D, Carey KB. Self-reported drinking game participation of incoming college students. *Journal of American College Health* 2003;51:149–154. [PubMed: 12735390]
- Boyd CJ, McCabe SE, d'Arcy H. Collegiate living environments: A predictor of binge drinking, negative consequences, and risk-reducing behaviors. *Journal of Addictions Nursing* 2004;15:111–118.
- Boyle JR, Boekeloo BO. Perceived parental approval of drinking and its impact on problem drinking behavior among first-year college students. *Journal of American College Health* 2006;54:238–244. [PubMed: 16450849]
- Brennan AF, Walfish S, AuBuchon P. Alcohol use and abuse in college students. II. Social/environmental correlates, methodological issues, and implications for intervention. *International Journal of the Addictions* 1986;21:475–493. [PubMed: 3533795]
- Campo S, Cameron KA. Differential effects of exposure to social norms campaigns: A cause for concern. *Health Communication* 2006;19:209–219. [PubMed: 16719724]
- Canterbury RJ, Gressard CF, Vieweg VWR, Grossman SJ, Westerman PS, McKelway RB. Psychosocial inventory among first year college students by patterns of alcohol use. *Advances in Alcohol and Substance Abuse* 1990;19:1–11. [PubMed: 2288299]
- Capone C, Wood MD, Borsari B, Laird RD. Fraternity/sorority involvement, social influences and alcohol use among college students: A prospective examination. *Psychology of Addictive Behaviors*. in press
- Cashin JA, Presley CA, Meilman PW. Alcohol use in the Greek system: Follow the leader? *Journal of Studies on Alcohol* 1998;59:63–70. [PubMed: 9498317]
- Chiauzzi E, Green T, Lord S, Thum C, Goldstein M. My Student Body: A high risk drinking prevention website for college students. *Journal of American College Health* 2005;53:263–274. [PubMed: 15900990]
- Christie NG, Dinham SM. Institutional and external influences on social integration in the freshman year. *Journal of Higher Education* 1991;62:412–436.
- Cialdini, RB.; Kallgren, CA.; Reno, RR. A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behaviors.. In: Zanna, M., editor. *Advances in experimental social psychology*. 24. Academic Press; New York: 1991.
- Clapp JD, Lange JE, Russell C, Shillington A, Voas RB. A failed norms social marketing campaign. *Journal of Studies on Alcohol* 2003;64:409–414. [PubMed: 12817831]
- Correia CJ, Benson T, Carey KB. Decreased substance use following increases in alternative behaviors: A preliminary investigation. *Addictive Behaviors* 2005;30:19–27. [PubMed: 15561446]
- Crocker J. The costs of seeking self-esteem. *Journal of Social Issues* 2002;58:597–615.
- Darkes J, Goldman MS. Expectancy challenge and drinking reduction: Experimental evidence for a mediational process. *Journal of Consulting and Clinical Psychology* 1993;61:344–353. [PubMed: 8473588]

- Davis, R.; DeBarros, A. In college first year is by far the riskiest. *USA Today*. Jan 25 2006 [January 26, 2006]. from: <http://www.usatoday.com/printedition/news/index.htm>
- Davis, R.; DeBarros, A. In college, first year is by far the riskiest. *USA Today*. Jan 25. 2006 Available: http://www.usatoday.com/news/nation/2006-01-24-campus-deaths-cover_x.htm
- Deacon S, Cohen E. Alcohol attitudes and behaviors of freshmen and their parents. *Journal of College Student Personnel* 1986;27:490–495.
- Del Boca FK, Darkes J, Greenbaum PE, Goldman MS. Up close and personal: Temporal variability in the drinking of individual college students during their first year. *Journal of Consulting and Clinical Psychology* 2004;72:155–164. [PubMed: 15065951]
- DeJong W, Langford LM. A typology for campus-based alcohol prevention: Moving toward environmental management strategies. *Journal of Studies on Alcohol* 2002;14(Suppl):140–147.
- DeJong W, Schneider SK, Towvim LG, Murphy MJ, Doerr EE, Simonsen NR, et al. A multisite randomized trial of social norms marketing campaigns to reduce college student drinking. *Journal of Studies on Alcohol* 2006;67:868–879. [PubMed: 17061004]
- Dillman DA. The design and administration of mailed surveys. *Annual Review of Sociology* 1991;17:225–249.
- Dimeff, LA.; Baer, JS.; Kivlahan, DR.; Marlatt, GA. Brief alcohol screening and intervention for college students: A harm reduction approach. The Guilford Press; New York: 1999.
- Dorsey PM, Scherer CW, Real K. The college tradition of ‘drink ‘til you drop’: The relation between students’ social networks and engaging in risk behaviors. *Health Communication* 1999;11:313–334.
- Duncan GJ, Boisjoly J, Kremer M, Levy DM, Eccles J. Peer effects in drug use and sex among college students. *Journal of Abnormal Clinical Psychology* 2005;33:375–385.
- Engs RC, Hanson DJ. Drinking games and problems related to drinking among moderate and heavy drinkers. *Psychological Reports* 1993;73:115–120. [PubMed: 8367548]
- Faulkner KK, Alcorn JC, Garvin RB. Prediction of alcohol consumption among fraternity pledges. *Journal of Alcohol and Drug Education* 1989;34:12–20.
- Foster SE, Vaughan RD, Foster WH, Califano JA. Alcohol consumption and expenditures for underage drinking and adult excessive drinking. *JAMA* 2003;289:989–995. [PubMed: 12597750]
- Fournier AK, Ehrhart IJ, Glindemann KE, Geller ES. Intervening to decrease alcohol use at university parties: Differential reinforcement of intoxication level. *Behavior Modification* 2004;28:167–181. [PubMed: 14997946]
- Galen LW, Rogers WM. Religiosity, alcohol expectancies, drinking motives and their interaction in the prediction of drinking among college students. *Journal of Studies on Alcohol* 2004;65:469–476. [PubMed: 15376822]
- Gentleman, J. As young adults drink to win, marketers join in. *The New York Times*; Oct 16. 2005 p. 1p. 26
- Grant BF, Harford TC, Grigson MB. Stability of alcohol consumption among youth: A national longitudinal survey. *Journal of Studies on Alcohol* 1988;49:253–260. [PubMed: 3374139]
- Greenbaum PE, Del Boca FK, Wang C, Goldman MS. Variation in the drinking trajectories of freshman college students. *Journal of Consulting and Clinical Psychology* 2005;73:229–238. [PubMed: 15796630]
- Grekin ER, Sher KJ. Alcohol dependence symptoms among college freshmen: Prevalence, stability and person–environment interactions. *Experimental and Clinical Psychopharmacology* 2006;14:329–338. [PubMed: 16893276]
- Haines M, Spear SF. Changing the perception of the norm: A strategy to decrease binge drinking among college students. *Journal of American College Health* 1996;45:134–140. [PubMed: 8952206]
- Hair P, Hampson SE. The role of impulsivity in predicting maladaptive behavior among female students. *Personality and Individual Differences* 2006;40:943–952.
- Ham LS, Hope DA. College students and problematic drinking: A review of the literature. *Clinical Psychology Review* 2003;23:719–759. [PubMed: 12971907]
- Harford TC, Wechsler H, Muthen BO. Alcohol-related aggression and drinking at off-campus parties and bars: A national study of current drinkers in college. *Journal of Studies on Alcohol* 2003;64:704–711. [PubMed: 14572193]

- Harford TC, Wechsler H, Seibring M. Attendance and alcohol use at parties and bars in college: A national survey of current drinkers. *Journal of Studies on Alcohol* 2002;63:726–733. [PubMed: 12529073]
- Hartzler B, Fromme K. Heavy episodic drinking and college entrance. *Journal of Drug Education* 2003;33:259–274. [PubMed: 15022860]
- Hays RB, Oxley D. Social network development and functioning during a life transition. *Journal of Personality and Social Psychology* 1986;50:305–313. [PubMed: 3701579]
- Hendershot CS, MacPherson L, Myers MG, Carr LG, Wall TL. Psychosocial, cultural and genetic influences on alcohol use in Asian American youth. *Journal of Studies on Alcohol* 2005;66:185–195. [PubMed: 15957669]
- Hingson RW, Heeren T, Winter M, Wechsler H. Magnitude of alcohol-related morbidity and mortality among U.S. college age students 18–24: Changes from 1998–2001. *Annual Review of Public Health* 2005;26:259–279.
- Ichiyama MA, Kruse MI. The social contexts of binge drinking among private university freshmen. *Journal of Alcohol and Drug Education* 1998;44:18–33.
- Igra A, Moos R. Alcohol use among college students: Some competing hypotheses. *Journal of Youth and Adolescence* 1979;8:393–405.
- Jaccard J, Turrisi R. Parent-based intervention strategies to reduce adolescent alcohol-impaired driving. *Journal of Studies on Alcohol. Supplement* 1999;13:84–93. [PubMed: 10225492]
- Jackson KM, Sher KJ, Gotham HJ, Wood PK. Transitioning into and out of large-effect drinking in young adulthood. *Journal of Abnormal Psychology* 2001;110:378–391. [PubMed: 11502081]
- Jennison KM. The short-term effects and unintended long-term consequences of binge drinking in college: A 10 year follow-up study. *American Journal of Drug and Alcohol Abuse* 2004;30:659–684. [PubMed: 15540499]
- Johnson AM, Rodger SC, Harris JA, Edmunds LA, Wakabayashi P. Predictors of alcohol consumption in university residences. *Journal of Drug Education* 2005;49:9–18.
- Johnson PB, Johnson HL. Reaffirming the power of parental influence on adolescent smoking and drinking decisions. *Adolescent and Family Health* 2001;2:37–43.
- Johnson TJ, Cropsey KL. Sensation seeking and drinking game participation in heavy-drinking college students. *Addictive Behaviors* 2000;25:109–116. [PubMed: 10708325]
- Johnson TJ, Wendel J, Hamilton S. Social anxiety, alcohol expectancies, and drinking-game participation. *Addictive Behaviors* 1998;23:65–79. [PubMed: 9468744]
- Johnston, LD.; O'Malley, PM.; Bachman, JG. Monitoring the Future national survey results on drug use, 1975–2002. Volume II: College students and adults ages 19 – 40. National Institute on Drug Abuse; Bethesda, MD: 2003. NIH Publication No. 03–5376
- Johnston TJ, Stahl C. Sexual experiences associated with participation in drinking games. *Journal of General Psychology* 2004;131:304–320. [PubMed: 15248595]
- Kahler CW, Read JP, Wood MD, Palfai TP. Social environment selection as a mediator of gender, ethnic, and personality effects on college student drinking. *Psychology of Addictive Behaviors* 2003;17:226–234. [PubMed: 14498817]
- Kidorf M, Sherman MF, Johnson JG, Bigelow GE. Alcohol expectancies and changes in beer consumption of first-year college students. *Addictive Behaviors* 1995;20:225–231. [PubMed: 7484316]
- Kilmer JR, Larimer ME, Parks GA, Dimeff LA, Marlatt GA. Liability management or risk management? Evaluation of a Greek system alcohol policy. *Psychology of Addictive Behaviors* 1999;13:268–278.
- Klein H. College student's attitudes toward the use of alcoholic beverages. *Journal of Alcohol and Drug Education* 1992;37:35–52.
- Knight JR, Wechsler H, Kuo M, Siebring M, Weitzman ER, Schuckit MA. Alcohol abuse and dependence among U.S. college students. *Journal of Studies on Alcohol* 2002;63:263–270. [PubMed: 12086126]
- Kraemer HC, Stice E, Kazdin A, Offord D, Kupfer D. How do risk factors work together? Mediators, moderators and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry* 2001;158:848–856. [PubMed: 11384888]
- Kuh GD, Arnold JC. Liquid bonding: A cultural analysis of the role of alcohol in fraternity pledgship. *Journal of College Student Development* 1993;34:327–334.

- Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. *Clinical Psychology Review* 2005;25:841–861. [PubMed: 16095785]
- Kuo M, Wechsler H, Greenberg P, Lee H. The marketing of alcohol to college students: The role of low prices and special promotions. *American Journal of Preventive Medicine* 2003;25:204–211. [PubMed: 14507526]
- Kushner MG, Sher KJ, Wood MD, Wook PK. Anxiety and drinking behavior: Moderating effects of tension-reduction alcohol outcome expectancies. *Alcoholism, Clinical and Experimental Research* 1994;18:852–860.
- LaBrie JW, Pedersen ER, Lamb TF, Bove L. Heads UP! A nested intervention with freshmen male college students and the broader campus community to promote responsible drinking. *Journal of American College Health* 2006;54:301–304. [PubMed: 16539223]
- Larimer ME, Cronce JM. Identification, prevention, and treatment: A review of individual-focused strategies to reduce problematic alcohol consumption by college students. *Journal of Studies on Alcohol. Supplement* 2002;14:148–163. [PubMed: 12022721]
- Larimer ME, Turner AP, Anderson BK, Foder JS, Kilmer JR, Palmer RS, et al. Evaluating a brief alcohol intervention with fraternities. *Journal of Studies on Alcohol* 2001;62:370–380. [PubMed: 11414347]
- Larimer ME, Cronce JM, Lee CM, Kilmer JR. Brief intervention in college settings. *Alcohol Research and Health* 2004;28:94–104. [PubMed: 19006997]
- Lau RR, Quadrel MJ, Hartman KA. Development and change of young adult's preventative health beliefs and behavior: Influences from parents and peers. *Journal of Health and Social Behavior* 1990;31:240–259. [PubMed: 2133479]
- Lee CM, Maggs JL, Rankin LA. Spring break trips as a risk factor for heavy alcohol use among first-year college students. *Journal of Studies on Alcohol* 2006;67:911–916. [PubMed: 17061009]
- Leibsohn J. The relationship between drug and alcohol use and peer group associations of college freshmen as they transition from high school. *Journal of Drug Education* 1994;24:177–192. [PubMed: 7844692]
- Li TK, Beard JD, Orr WE, Kwo PY, Ramchandani VA. Gender and ethnic differences in alcohol metabolism. *Alcoholism, Clinical and Experimental Research* 1998;22:771–772.
- Lichtenfield M, Kayson WA. Factors in college students' drinking. *Psychological Reports* 1994;74:927–930. [PubMed: 8058881]
- Lo CC, Globetti G. A partial analysis of the campus influence on drinking behavior: Students who enter college as non-drinkers. *Journal of Drug Issues* 1993;23:715–725.
- Lo CC, Globetti G. The facilitating and enhancing roles Greek associations play in college drinking. *International Journal of the Addictions* 1995;30:1311–1322. [PubMed: 7591346]
- Maggs, JL. Alcohol use and binge drinking as goal-directed action during the transition to post-secondary education. In: Schulenberg, J.; Maggs, JL.; Hurrelman, K., editors. *Health risks and developmental transitions during adolescence*. Cambridge University Press; New York: 1997. p. 345–371.
- Marlatt GA, Baer JS, Kivlahan DR, Dimeff LA, Larimer ME, Quigley LA, et al. Screening and brief intervention for high risk college student drinkers: Results from a two-year follow-up assessment. *Journal of Consulting and Clinical Psychology* 1998;66:604–615. [PubMed: 9735576]
- McCabe SE, Schulenberg JE, Johnston LD, O'Malley PM, Bachman JG, Kloska DD. Selection and socialization effects of fraternities and sororities on US college student substance use: A multi-cohort national longitudinal study. *Addiction* 2005;100:512–514. [PubMed: 15784066]
- Michael KD, Curtin L, Kirkley DE, Jones DL, Harris R. Group-based motivational interviewing for alcohol use among college students: An exploratory study. *Professional Psychology, Research and Practice* 2006;6:629–634.
- Miller, WR.; Rollnick, S. *Motivational interviewing: Preparing people for change*. 2nd ed.. Guilford; New York: 2002.
- Moffat M. College life: Undergraduate culture and higher education. *Journal of Higher Education* 1991;62:44–61.
- Moos R, Moos B, Kulik J. College student abstainers, moderate drinkers, and heavy drinkers: A comparative analysis. *Journal of Youth and Adolescence* 1976;5:349–360.
- Moos R, Moos B, Kulik J. Behavioral and self-concept antecedents and correlates of college student drinking patterns. *International Journal of the Addictions* 1977;12:613–615.

- Mounts N. Contributions of parenting and campus climate to freshmen adjustment in a multiethnic sample. *Journal of Adolescent Research* 2004;19:468–491.
- Mrazek, PJ.; Haggerty, RJ. Reducing risks for mental disorders: Frontiers for preventive intervention research. National Academy Press; Washington, DC: 1994.
- Mullen, B. Advanced BASIC meta-analysis. Erlbaum.; New Jersey: 1989.
- Murphy JG, Barnett NP, Colby SM. Alcohol-related and alcohol-free activity participation and enjoyment among college students: A behavioral theories of choice analysis. *Experimental and Clinical Psychopharmacology* 2006;14:339–349. [PubMed: 16893277]
- Murphy JG, Barnett NP, Goldstein AL, Colby SM. Gender moderates the relationship between substance-free activity enjoyment and substance use. *Psychology of Addictive Behaviors*. in press
- Murphy JG, Correia CJ, Colby SM, Vuchinich RE. Using behavioral theories of choice to predict drinking outcomes following a brief intervention. *Experimental and Clinical Psychopharmacology* 2005;13:93–101. [PubMed: 15943542]
- Murphy JG, Duchnick JJ, Vuchinich RE, Davison JW, Karg RS, Olson AM, et al. Relative efficacy of a brief motivational intervention for college student drinkers. *Psychology of Addictive Behaviors* 2001;15:373–379. [PubMed: 11767271]
- Murphy JG, MacKillop J. Relative reinforcing efficacy of alcohol among college student drinkers. *Experimental and Clinical Psychopharmacology* 2006;14:219–227. [PubMed: 16756426]
- Nagoshi CT, Wood MD, Cote CC, Abbit SM. College drinking game participation within the context of other predictors of other alcohol use and problems. *Psychology of Addictive Behaviors* 1994;8:203–213.
- National Institute on Alcohol Abuse and Alcoholism. What parents need to know about college drinking. 2002a. National Advisory Council on Alcohol Abuse and Alcoholism Task Force on College Drinking. NIH Publication No. 02–5015. USDHHS. Located at: www.collegedrinkingprevention.gov
- National Institute on Alcohol Abuse and Alcoholism. Use proven strategies, fill research gaps. 2002b. Final report on the panel on contexts and consequences. National Advisory Council on Alcohol Abuse and Alcoholism Task Force on College Drinking. USDHHS. Located at: www.collegedrinkingprevention.gov
- Neighbors C, Larimer ME, Lewis MA. Targeting misperceptions of descriptive drinking norms: Efficacy of a computer-delivered personalized normative feedback intervention. *Journal of Consulting and Clinical Psychology* 2004;72:434–447. [PubMed: 15279527]
- O'Connor RM, Colder CR. Predicting alcohol patterns in first-year college students through motivational systems and reasons for drinking. *Psychology of Addictive Behaviors* 2005;19:10–20. [PubMed: 15783273]
- O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol. Supplement* 2002;14:23–39. [PubMed: 12022728]
- Paschall MJ, Freisthler B. Does heavy drinking affect academic performance in college? Findings from a prospective study of high achievers. *Journal of Studies on Alcohol* 2003;64:515–519. [PubMed: 12921193]
- Perkins HW. Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol. Supplement* 2002;14:91–100. [PubMed: 12022733]
- Perkins, HW. The social norms approach to preventing school and college age substance abuse: A handbook for educators, counselors, and clinicians. Jossey-Bass; San Francisco, CA: 2003.
- Perkins HW, Craig DW. A successful social norms campaign to reduce alcohol misuse among college student–athletes. *Journal of Studies on Alcohol* 2006;67:880–889. [PubMed: 17061005]
- Read JP, Wood MD, Davidoff OJ, McLacken J, Campbell JF. Making the transition from high school to college: The role of alcohol-related social influence factors in students' drinking. *Substance Abuse* 2002;23:53–65. [PubMed: 12444360]
- Reifman A, Watson WK. Binge drinking during the first semester of college: Continuation and desistance from high school patterns. *Journal of American College Health* 2003;52:73–81. [PubMed: 14765761]
- Rimal RN, Real K. How behaviors are influenced by perceived norms. *Communication Research* 2005;32:389–414.

- Rutledge PC, Sher KJ. Heavy drinking from the freshman year into early young adulthood: The roles of stress, tension-reduction drinking motives, gender and personality. *Journal of Studies on Alcohol* 2001;62:457–466. [PubMed: 11523533]
- Schall M, Kemeny A, Maltzman I. Factors associated with alcohol use in university students. *Journal of Studies on Alcohol* 1992;53:122–136. [PubMed: 1560664]
- Scheir LM, Botvin GJ. Expectancies as mediators of the effects of social influences and alcohol knowledge on adolescent alcohol use: A prospective analysis. *Psychology of Addictive Behaviors* 1997;11:48–64.
- Schulenberg JE, Maggs JL. A developmental perspective on alcohol use and heavy during the transition to young adulthood. *Journal of Studies on Alcohol. Supplement* 2002;14:54–70. [PubMed: 12022730]
- Schulenberg JE, O'Malley PM, Bachman JG, Johnston LD. Getting drunk and growing up: Trajectories of frequent binge drinking during the transition to young adulthood. *Journal of Studies on Alcohol* 1996;57:289–304. [PubMed: 8709588]
- Sessa FM. The influence of perceived parenting on substance use during the transition to college: A comparison of male residential and commuter students. *Journal of College Student Development* 2005;46:62–74.
- Sher KJ, Gotham HJ. Pathological alcohol involvement: A developmental disorder of young adulthood. *Development and Psychopathology* 1999;11:933–956. [PubMed: 10624733]
- Singer, JD.; Willett, JB. *Applied longitudinal data analysis*. Oxford University Press; New York: 2003.
- Slutske WS. Alcohol use disorders among US college students and their non-college-attending peers. *Archives of General Psychiatry* 2005;62:321–327. [PubMed: 15753245]
- Slutske WS, Hunt-Carter EE, Nabors-Oberg RE, Sher KJ, Bucholz KK, et al. Do college students drink more than their non-college-attending peers? Evidence from a population-based longitudinal female twin study. *Journal of Abnormal Psychology* 2004;113:530–540. [PubMed: 15535786]
- So DW, Wong FY. Alcohol, drugs, and substance use among Asian–American college students. *Journal of Psychoactive Drugs* 2006;38(1):35–42. [PubMed: 16681174]
- Standing L, Nicholson B. Models for student drinking and smoking: Parents or peers? *Social Behavior and Personality* 1989;17:223–229.
- Stephenson MT, Hoyle RH, Palmgreen P, Slater MD. Brief measures of sensation seeking for screening and large-scale surveys. *Drug and Alcohol Dependence* 2003;72:279–286. [PubMed: 14643945]
- Sweet S. Understanding fraternity hazing: Insights from symbolic interactionist theory. *Journal of College Student Development* 1999;40:355–364.
- Thombs, DL. *An introduction to addictive behaviors*. 2nd ed. Guilford Press; New York: 1999.
- Thombs DL, Hamilton MJ. Effects of a social norms feedback campaign on the drinking norms and behavior of division I student–athletes. *Journal of Drug Education* 2002;32:227–244. [PubMed: 12379053]
- Thombs DL, Olds RS, Ray-Tomasek J. Adolescent perceptions of college student drinking. *American Journal of Health Behavior* 2001;25:492–501. [PubMed: 11518343]
- Toomey TL, Wagenaar AC. Environmental Policies to reduce college drinking: Options and research findings. *Journal of Studies on Alcohol. Supplement* 2002;14:193–205. [PubMed: 12022725]
- Turrisi R, Padilla KK, Wiersma KA. College student drinking: An examination of theoretical models of drinking tendencies in freshmen and upperclassmen. *Journal of Studies on Alcohol* 2000;61:598–602. [PubMed: 10928730]
- Turrisi R, Wiersma KA, Hughes KK. Binge-drinking-related consequences in college students: Role of drinking beliefs and mother–teen communications. *Psychology of Addictive Behaviors* 2000;14:342–355. [PubMed: 11130153]
- Turrisi R, Jaccard J, Taki R, Dunham H, Grimes J. Examination of the short-term efficacy of a parent intervention to reduce college student drinking tendencies. *Psychology of Addictive Behaviors* 2001;15:366–372. [PubMed: 11767270]
- Turner AP, Larimer ME, Sarason IG. Family risk factors for alcohol-related consequences and poor adjustment in fraternity and sorority members: Explaining the role of parent–child conflict. *Journal of Studies on Alcohol* 2000;61:818–826. [PubMed: 11188487]

- Wagenaar AC, Toomey TL. Effects of minimum drinking age laws: Review and analysis of the literature from 1960 to 2000. *Journal of Studies on Alcohol. Supplement* 2002;14:206–225. [PubMed: 12022726]
- Wall A. On-line alcohol health education curriculum evaluation: Harm reduction findings among fraternity and sorority members. *Oracle: The Research Journal of the Association of Fraternity Advisors* 2006;2:29–45.
- Walters ST, Neighbors C. Feedback interventions for college alcohol misuse: What, why and for whom? *Addictive Behaviors* 2005;30:1168–1182. [PubMed: 15925126]
- Walters, ST.; Baer, JS. Talking with college students about alcohol: Motivational strategies for reducing abuse. Guilford; New York: 2006.
- Walters ST, Miller E, Chiauuzzi E. Wired for wellness: E-interventions for addressing college drinking. *Journal of Substance Abuse Treatment* 2005;29:139–145. [PubMed: 16135342]
- Walters ST, Vader AM, Harris TR. A controlled trial of web-based feedback for heavy drinking college students. *Prevention Science*. in press
- Wechsler H, Dowdall GW, Davenport A, Castillo S. Correlates of college student binge drinking. *American Journal of Public Health* 1995;85:921–926. [PubMed: 7604914]
- Wechsler H, Kuo M, Lee H, Dowdall GW. Environmental correlates of underage alcohol use and related problems of college students. *American Journal of Preventive Medicine* 2000;19:24–29. [PubMed: 10865160]
- Wechsler H, Lee JE, Kuo M, Seibring M, Nelson TF, Lee H. Trends in college binge drinking during a period of increased prevention efforts. *Journal of American College Health* 2002;50:203–217. [PubMed: 11990979]
- Wechsler H, Nelson TE, Lee JE, Seibring M, Lewis C, Keeling RP. Perception and reality: A national evaluation of social norms marketing interventions to reduce college students' heavy alcohol use. *Journal of Studies on Alcohol* 2003;64:484–494. [PubMed: 12921190]
- Wechsler H, Seibring M, Liu I, Ahl M. Colleges respond to student binge drinking: Reducing student demand or limiting access. *Journal of American College Health* 2004;52:159–168. [PubMed: 15018427]
- Wechsler, H.; Wuethrich, B. Dying to drink: Confronting binge drinking on college campuses. Rodale Press; Emmaus, PA: 2002.
- Weitzman ER, Kawachi I. Giving means receiving: The protective effect of social capital on binge drinking on college campuses. *American Journal of Public Health* 2000;90:1936–1939. [PubMed: 11111272]
- Weitzman ER, Folkman A, Folkman KL, Wechsler H. The relationship of alcohol outlet density to heavy and frequent drinking and drinking-related problems among college students at eight universities. *Health and Place* 2003;9:1–6. [PubMed: 12609468]
- Weitzman ER, Nelson TF, Wechsler H. Taking up binge drinking in college: The influences of person, social group, and environment. *Journal of Adolescent Health* 2003;32:26–35. [PubMed: 12507798]
- Werner MJ, Greene JW. Problem drinking among college freshmen. *Journal of Adolescent Health* 1992;13:487–492. [PubMed: 1390815]
- Werner MJ, Walker LS, Greene JW. Problem drinking among college freshmen. *Journal of Adolescent Health* 1992;13:487–492. [PubMed: 1390815]
- White AM, Kraus CL, Swartzwelder HS. Many college freshmen drink at levels far beyond the binge threshold. *Alcoholism, Clinical and Experimental Research* 2006;30:1006–1010.
- White HR, Jackson K. Social and psychological influences on emerging adult drinking behavior. *Alcohol Research and Health* 2005;28:182–190.
- White HR, McMorris BJ, Catalano RF, Fleming CB, Haggerty KP, Abbott RD. Increases in alcohol and marijuana use during the transition out of high school into emerging adulthood: The effects of leaving home, going to college, and high school protective factors. *Journal of Studies on Alcohol* 2006;67:810–822. [PubMed: 17060997]
- Windle M. Parental, sibling, and peer influences on adolescent substance use and alcohol problems. *Applied Developmental Science* 2000;4:98–110.

- Wood MD, Sher KJ, McGowan AK. Collegiate alcohol abuse and young adult role functioning: Results from a prospective high-risk study. *Journal of Studies on Alcohol* 2000;61:278–289. [PubMed: 10757139]
- Wood MD, Read JP, Mitchell RE, Brand NH. Do parents still matter? Parent and peer influences on alcohol involvement among recent high school graduates. *Psychology of Addictive Behaviors* 2004;18:19–30. [PubMed: 15008682]
- Wood, PK.; Sher, KJ.; Rutledge, PC. Early college alcohol consumption patterns, class schedule and academic performance; Presented at the annual meeting of the Research Society on Alcoholism; Jun. 2005
- Wright SW, Slovis CM. Drinking on campus: Undergraduate intoxication requires emergency care. *Archives of Pediatric and Adolescent Medicine* 1996;150:699–702.
- Wright SW, Norton VS, Dake AD, Pinkston JR, Slovis CM. Alcohol on campus: Alcohol-related emergencies in undergraduate college students. *Southern Medical Journal* 1999;91:909–913. [PubMed: 9786284]
- Zamboanga BL, Leitowski LK, Rodriguez L, Cascio KA. Drinking games in female students: More than just a game? *Addictive Behaviors* 2006;31:1485–1489. [PubMed: 16364557]
- Zamboanga BL, Raffaelli M, Horton NJ. Acculturation status and heavy alcohol use among Mexican American college students: Investigating the moderating role of gender. *Addictive Behaviors* 2006;31:2188–2198. [PubMed: 16603321]

Table 1

Recommended interventions for mediators, moderators, and environmental influences on first-year alcohol use

Influence	Research	Recommendations
<i>Moderators</i>		
Sensation seeking	Higher levels of sensation seeking associated with heavy drinking	<i>Screening:</i> Measure sensation seeking as one potential indicator of alcohol-related risk and need for intervention, perhaps as part of an online assessment prior to matriculation.
Race	Anglo—American students drink the most, followed by Hispanic and African—American students	<i>Screening:</i> Measure race as one potential indicator of alcohol-related risk and need for intervention.
Gender	Men drink more frequently and in greater quantities than women, though both genders experience similar levels of intoxication and problems	<i>Screening:</i> Both men and women are at high risk for alcohol problems and could benefit from primary or secondary prevention efforts. Gender specific measures of heavy drinking may be more sensitive indicators of risk among women. <i>Intervention:</i> Use norms and feedback that are gender specific.
Religiosity	Students who are more religious report less heavy alcohol use	<i>Screening:</i> Measure religiosity as one potential indicator of decreased alcohol-related risk.
Pre-college alcohol use	Students who come to college as heavy drinkers tend to maintain or increase their drinking once on campus	<i>Screening:</i> Identify at-risk students and offer outreach/support. <i>Intervention:</i> Educate first year students about risks associated with heavy drinking.
Parental influences	College students' attitudes and behaviors regarding alcohol use are influenced by parents	<i>Screening:</i> Identify at-risk students and offer outreach/support. <i>Intervention:</i> Include parents in pre-college interventions which address alcohol use. Distribute materials to parents to educate them regarding the college drinking environment.
<i>Mediators</i>		
Coping	Students use alcohol to cope with stress, tension.	<i>Intervention:</i> Develop more adaptive coping strategies, perhaps in context of BMIs.
Expectancies	Expectancies of the effects of alcohol (e.g., drinking makes me more satisfied with myself) are associated with heavy drinking	<i>Intervention:</i> Expectancies can be addressed as a component of BMIs or on their own (e.g., expectancy challenge; Darkes & Goldman, 1993).
Motives	Students view alcohol use as a way to facilitate socialization	<i>Intervention:</i> Address the learning of socialization skills in order to reduce social anxiety. <i>Policy:</i> Provide alcohol-free socialization alternatives.
Perceived norms	Students tend to overestimate descriptive and injunctive norms, which in turn can increase personal alcohol use	<i>Intervention:</i> Address perceived norms in the context of individual BMIs or Social Norms Marketing Campaigns. Early correction of misperception may be important, as many students come to school with misperceptions of campus drinking norms.
Greek membership	Selection and socialization create strong association between Greek involvement and alcohol consumption	<i>Screening:</i> Identify students who are planning to join Greek system and offer education regarding alcohol use. <i>Intervention:</i> Target Greek members for BMIs and house-wide interventions, preferably early in the school year. <i>Policy:</i> Monitor alcohol use in Greek system (especially during pledge period) through party registration, security being required at social functions, re-instituting system of house "mothers" and "fathers".
Drinking games	Many students come to college with a repertoire of drinking games. Drinking games are associated with increased alcohol use and problems.	<i>Screening:</i> Identify at-risk students and offer outreach/support. <i>Intervention:</i> Risks associated with drinking games can be discussed in context of BMIs and group interventions. <i>Policy:</i> Restrictions on drinking games can be enforced, especially with games that involve many players and/or equipment (e.g., beer pong).
<i>Environmental influences</i>	Alcohol has long been viewed as a vital part of college social life and is often present at student social functions, alumni events, and campus athletic events. As a result, the cultural stereotype of the heavy drinking college student perpetuates the expectation that college is a place to drink excessively before assuming the responsibilities of adulthood	<i>Policy:</i> - Decrease the availability of alcohol - Increase price of alcohol - Increase enforcement of campus alcohol regulations - Increase enforcement of minimum drinking age - Increase adult presence in living environments - Increase alternative activities - Increase students' academic and volunteer work

Note: BMIs = Brief Motivational Interventions.

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