

# Student Factors: Understanding Individual Variation in College Drinking

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**ABSTRACT.** *Objective:* Research on individual differences in drinking rates and associated problems among college students is reviewed. *Method:* Studies are included if completed within U.S. college and university samples and found in published scientific literature as identified by several searches of national databases. *Results:* The resulting review suggests first that the extant literature is large and varied in quality, as most studies use questionnaire responses from samples of convenience in cross-sectional designs. Evidence from studies of college samples does consistently suggest that alcohol is consumed for several different purposes for different psychological effects in different contexts. A pattern of impulsivity/sensation seeking is strongly related to

increased drinking among students. This pattern is supported by research into personality, drinking motives, alcohol expectancies and drinking contexts. A second pattern of drinking associated with negative emotional states is also documented. Some long-term consequences of this second pattern have been described. Social processes appear especially important for drinking in many college venues and may contribute to individual differences in drinking more than enduring personality differences. *Conclusions:* Future research efforts should test interactive and mediating models of multiple risk factors and address developmental processes. (*J. Stud. Alcohol*, Supplement No. 14: 40-53, 2002)

**T**HIS REVIEW addresses individual variation in drinking among college students. The review is based on the observation that alcohol consumption is not uniformly extreme in the population. For example, in an analysis by Wechsler et al. (1999), the statistical average for consumption of alcohol in a week by a college student is about five standard drinks. Variability, however, is high. In the Wechsler et al. (1999) report, the top 17% of the sample (those students who drink heavily and frequently) consumed 68% of all alcohol drunk by college students. The 56% of students who do not drink heavily consumed only 9% of the total alcohol consumed. Which college students drink most and have the most problems as a result, and why do they do it? How do they differ from their moderate drinking or sober peers? The focus of this review is both to identify and understand this variability.

Variables that might account for this variability cover a wide range of biological, psychological and social factors, and this review will cover only a subset. In particular, other reviews in this series will address: the relationship between basic demographic variables and alcohol consumption, including age, gender and ethnicity (O'Malley and Johnston, this supplement); broad or distal aspects of the college environment, such as alcohol availability and pricing, adver-

tising, legal and university rules and regulations and enforcement (Toomey and Wagenaar, this supplement); and models of risk based on understanding of human development (Schulenberg and Maggs, this supplement). Reviewed herein are studies of stable individual characteristics in relation to drinking, including family history, genetics and human personality as well as psychological processes concerning the perceived effects of alcohol, motivation to drink, interpersonal (social and peer) relations and social norms. Studies concerning the impact of immediate or proximal college-specific social contexts and activities that students select (e.g., athletics or fraternities) are also addressed. It is noteworthy that social contexts and activities represent factors that influence drinking at both individual and social levels.

Studies are included if completed within U.S. college and university samples and found in published scientific literature as identified by several searches of national databases by searching both title and abstract for reference to *college* or *university*. No age requirements were imposed within the search; the vast majority of studies assess undergraduate students between the ages of 18 and 21. Studies published before 1985 generally are summarized based on a comprehensive review published in 1986 (Brennan et al., 1986a,b). Key or exemplary studies will be highlighted, rather than all studies catalogued. Following a commentary on methodological issues, the research literature with respect to college student drinking will be reviewed moving from micro to macro levels of effects and developmental

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course. Specifically, differences based on genetic and family history factors will be reviewed first, followed by research on aspects of personality. More psychological and potentially variable constructs of drinking motivation and alcohol expectancies are reviewed next, followed by research on social factors. In a concluding section, the results from this review will be considered relative to broader developmental models of alcohol-related problems etiology and future research agendas.

### **Methodological Considerations**

Many studies of individual variation in college drinking follow a similar format. Questionnaires measuring something about individual differences (e.g., aspects of personality) and self-report questionnaires about some aspects of drinking habits (e.g., frequency of drinking) are administered to a group of college students. Students are often taken from college classes (typically psychology courses) as convenient volunteers. Self-report questionnaire responses are then related to some aspect of drinking behavior. Although such studies do provide a starting point for future research, they can be quite limited with respect to interpretability and generalizability. A brief review of these methodological considerations is necessary before presentation of research findings.

First, student factors as indices for risk for drinking can be evaluated only with respect to some agreed-on standard for measuring drinking behavior. Unfortunately, the research literature is not consistent in how drinking is defined or measured among college students (Heck and Williams, 1995). To complicate matters further, the literature on adolescent drinking seems to suggest that different models of risk (relationships between individual differences and drinking behavior) may be found depending on how drinking is defined and measured (Baer et al., 1998). For this review, two classes of drinking measures are generally considered: drinking rates or levels (quantity and frequency of alcohol consumption) and drinking-related problems (negative consequences of drinking, including dependence and misuse diagnoses).

Second, design features often limit interpretations of observed relationships. Much of the research on college student populations uses measures that have not been developed carefully (or information on the quality of questionnaires simply is unavailable for the reader). Alternative explanations of results (e.g., the presence of third variables that account for relationships) are not often tested. Multiple measures of the same theoretical underlying constructs are rarely used to control for artifacts of measurement method. In addition, there are very few observational studies of college student drinking in relation to individual differences. Longitudinal designs are also quite exceptional. Without methodology to rule out many alternative explanations for

statistical relationships between the individual differences and drinking, causal interpretations generally cannot be made with confidence.

Third, the students who are actually involved in social-psychological research on college campuses pose an additional and key threat to the meaning and generalizability of much research on college drinking. As noted above, the typical study uses volunteers, often for extra credit in a psychology course. These "samples" of college students are used to study the "population" of college students. Yet volunteers from psychology classes may or may not be representative of all students. Thus the relationships observed in the study may not be true for other students. This is particularly important when the full range of an individual difference may not be present in the study sample (i.e., mild social anxiety, moderate anxiety in public speaking, severe anxiety resulting in clinical diagnosis). Very few studies of individual variation in college drinking attempt or succeed in generating samples of students that are documented to be representative of broader college populations.

Finally, statistical variation beyond that expected by chance (e.g., the accepted standards for "significant" findings) does not necessarily provide measures of the magnitude of differences observed. Many differences are described in social-psychological research that are simply too small to be used by policy-makers and prevention specialists to target programs and policies.

Despite this generally poor methodological quality in most studies, several consistent relationships have been observed. A few particularly well designed studies have been published in the past several years, and these will be described in more detail.

### **Family History and Parents' Behavior**

There has been great interest in the role of genetics and family history in the etiology of alcohol-related problems. However, relatively little research on the genetics of alcoholism has focused specifically on college students as a clinical population. Perhaps this is due to the fact that college students, on average, do not show signs of severe alcohol dependence even though a subset of students sometimes drink great quantities of alcohol. Further, research is at best mixed in documenting that college students with parents who have alcohol-related problems drink more or have more alcohol-related problems than their peers from nonalcoholic families. For example, Engs (1990) reported that rates of drinking were indistinguishable comparing college students who do and do not report a history of parental drinking problems. Alterman et al. (1989) and Havey and Dodd (1993) reported similar results (for a study of a female sample, see Bogart et al., 1995). Kushner and Sher (1993), in contrast, reported considerably higher rates of alcohol use disorders among Children of Alcoholics

(COAs) (35%) compared with non-COAs (16%) in a large sample of college students first assessed during their freshman year. Perkins and Berkowitz (1991) and Pullen (1994) also reported increased rates of alcohol-related problems for COAs compared with non-COAs. Rodney and Rodney (1996) found that black male COAs reported greater drinking than black non-COAs.

It is difficult to reconcile these disparate research findings. It is possible that larger samples are needed to detect relatively small COA effects (e.g., Alterman et al., 1989, studied less than 100 students); however, Eng's (1990) study was completed on a quite large sample of almost 1,000 students. Studies also vary in the way that family history is measured and defined. Studies that define family history quite conservatively (i.e., based on alcoholism treatment of parents) and rule out adoptive parents and stepparents to study genetic influence result in lower rates of COA membership and may be more likely to find different rates of drinking problems based on COA status (e.g., Kushner and Sher, 1993). Studies using broad assessments of family environment (Engs, 1990; Havey and Dodd, 1993) were among those failing to find COA effects. It is also possible that COAs do not necessarily drink at greater rates than other students (see Engs, 1990) but do report greater alcohol-related problems as a result (Kushner and Sher, 1993). Yet the self-report nature of studies of alcohol-related problems may limit confidence in results. Relative to non-COAs, COAs may be more willing to acknowledge or label behaviors as problems based on experiences growing up (George et al., 1999). For example, Pullen's (1994) study is based on Michigan Alcoholism Screening Test scores for students, which could be biased by Alcoholics Anonymous attendance for other family members. Given the somewhat select nature of populations of college students (i.e., college students must show promise in prior educational activities), it is also quite possible that those individuals with greatest risk for alcohol-related problems never enroll in the colleges where the research is conducted. Studies of COAs among college populations thus may include only the relatively successful COAs. This effect should be greatest within more elite institutions with highly competitive entrance requirements. In summary, although it appears likely that COAs within college populations may be at some increased risk for alcohol-related problems, the inconsistency of the research evidence suggests that it may be a smaller or more variable risk factor than when studied in other populations.

Independent of genetic risk, the behavior of parents, both generally and with respect to drinking, has been studied as a predictor of college drinking. Brennan et al. (1986b) reviewed 10 studies examining parental reports of drinking practices and students' reports of drinking practices. Eight of these studies showed positive but small effects, suggesting that drinking among college students was associated

with increased drinking by their parents. Studies were inconsistent with respect to gender differences, with some suggesting the effect was stronger among men and some studies suggesting the effect was stronger among women. All studies were based on student perceptions of parental behavior, which could easily be confounded by the students' own drinking practices and perceived norms for drinking.

It is possible that problems with generalized parenting skills, not restricted to parental alcohol use, are associated with college students' adjustment, which then indirectly affects alcohol use; this indirect relationship has been described in research on adolescent alcohol use (see Baumrind, 1991; Colder and Chassin, 1992). Among college students, MacDonald et al. (1991) reported that a family history of depression was predictive of alcohol misuse, but not a family history of drinking problems. Weiss and Schwartz (1996) tested Baumrind's framework for effective parenting with college students and documented that more poorly adjusted college students, including those using substances, more commonly had unengaged and authoritarian-directive parents. There is some suggestion that the relationship between parent and college student drinking exists only when the parent-child relationship is experienced as close (Jung, 1995) or the students perceive themselves as similar to the parent (Fromme and Ruela, 1994).

### Personality

Studies of student personality are among the most common with respect to alcohol use. Personality typically refers to characteristic ways of thinking, feeling and acting that show some consistency when measured across situations and over time. Research on personality and alcohol use and misuse here is organized based on three, broad-based personality constructs: impulsivity/disinhibition, extraversion/sociability and neuroticism/emotionality (Sher and Trull, 1994; Sher et al., 1999).

#### *Impulsivity/disinhibition*

One of the most consistent findings in Brennan et al.'s (1986a) review, demonstrated in 20 studies, was that a general personality dimension described as "impulse expression/sensation seeking" was associated with drinking more frequently, in greater quantities and with more negative consequences among college students. In these early studies, heavier drinkers were described as pleasure seeking, extraverted, impulsive, rebellious and nonconforming. This relationship appeared true for both men and women and for studies of observed behavior as well as self-report. Several studies in the Brennan et al. (1986a) review also documented that heavier drinkers consistently endorsed attitudes that were permissive of heavy drinking.

Since 1985, this relationship between a personality style of sensation seeking, disinhibition and nonconformity has been replicated consistently. College students described as impulsive (Camatta and Nagoshi, 1995) and disinhibited (Clapper et al., 1994); scoring higher on Minnesota Multiphasic Personality Inventory (MMPI) scales of Psychopathic Deviate and Hypomania (Valliant and Scanlan, 1996); with a history of deviant behavior (MacDonald et al., 1991), sensation seeking (Arnett, 1996; Johnson, 1989) and nonconforming (Havey and Dodd, 1993) drink more heavily and more frequently than other students. Students with a history of deviant conduct not only drink more before entering college, but increase their drinking rates to a greater degree on college entry (Baer et al., 1995). One study documented a relationship between anger and drinking problems as well (Leibsohn et al., 1994).

Nonconformity and deviance can also be implied by use of multiple substances and early life initiation of alcohol consumption. College students who report using marijuana and cigarettes are more likely to drink heavily (Wechsler et al., 1995). That heavy drinking does not always begin in college has now become firmly established. Gonzalez (1989) reported that only 7% of university students in Florida began drinking in college. This estimate is consistent with national studies of alcohol initiation, which typically begins in teenage years, before college (Johnston et al., 1995). In Gonzalez' (1989) study, students who began drinking earlier in life, particularly beginning in elementary or middle school, reported higher levels of drinking and greater alcohol-related problems than those who began in high school or college. This pattern has been noted in a study of a historically black college (Lo and Globetti, 1993). Clapper et al. (1994) further demonstrated that early onset of drinking was associated with rates of drinking among first-year college students even when personality and peer use variables were controlled. Wechsler et al. (1995), in their study of 140 campuses, found that the frequency of heavy episodic drinking in high school was predictive of the frequency of heavy episodic drinking in college when controlling for a variety of other individual difference measures.

The construct of sensation seeking and impulse expression and nonconformity encompasses a variety of trait adjectives and behavioral tendencies as noted above. Research to date has not demonstrated that particular or specific aspects of this general concept are more risky or important in the prediction of heavy drinking and problems than other aspects. Specific aspects of this general construct could represent noise or error in assessment of the general construct. At least one study (Earleywine et al., 1990) found that the relationship between measures of personality risk for drinking (California Psychological Inventory Socialization scale and MMPI MacAndrew scale) and self-reported drinking practices among college students was greatly increased when

the personality measures were treated as indicators of a single underlying construct. Based on this analysis, fluctuating relationships between measures of personality traits relevant to impulse control and measures of drinking could be due to unreliable assessment. On the other hand, it is noteworthy that the Disinhibition subscale of Zuckerman's Sensation Seeking Scale, which has been used frequently in this research, does contain items that specifically ask about alcohol use. A careful analysis of this scale, using college students as subjects, suggests that relationships between drinking and disinhibition could be exaggerated (Darkes et al., 1998).

*Religiosity/conventionality.* Consistent with research indicating that students who are more rebellious and less conforming to traditional values drink more, several studies show that students who are more religious and more committed to traditional values drink less. For example, the reasons students give for limiting their drinking have been characterized as reflecting their upbringing, performance, self-control and self-reform (Greenfield et al., 1989). In Wechsler et al.'s (1995) report on surveys of 140 colleges, the belief that "religion is important" was significantly and independently related to reduced frequency of heavy drinking. Engs et al. (1996) similarly noted that students who endorsed a questionnaire response that "religion was not important" drank more heavily and reported a greater incidence of drinking problems compared with others. In a survey of 264 college students, Patock-Peckham et al. (1998) showed that students with no religious affiliation drank more frequently and at a higher quantity but did not have greater problems than those with religious affiliations. Lack of religious affiliation was also associated with higher perceived drinking norms in this study. Lo and Globetti (1993) documented this relationship among students of a historically black college, and Poulson et al. (1998) documented a similar relationship, but only among southern women college students. Perkins (1994) also suggested that religiosity may protect against heavy drinking under contexts of greater ambiguity about drinking (less constraint). In this data set, the relationship between religiosity and drinking was greatest among men at periods of more permissive norms and when men perceived norms as more permissive.

#### *Extraversion/sociability*

The personality dimension of extraversion/sociability has also been investigated as an individual difference predictive of drinking in college students. Students rated as extraverted (Martsh and Miller, 1997) and those who rate parties as important (Wechsler et al., 1995) have been shown to drink more than other students. This relationship may be particularly relevant within college populations compared with both younger and older samples. Research examining

this relationship in noncollege populations is mixed (Wood et al., 2001). As reviewed by Wiggins and Wiggins (1992), some studies find relationships between sociability and drinking that are positive but weak, and many do not find the relationship at all. Nezlek et al. (1994), however, argued that even among college samples the relationship between drinking and sociability is likely quite complex. By analyzing daily logs of drinking and social activities of college students, Nezlek et al. suggested that the greatest intimacy was experienced by students who drank heavily occasionally. Those who did not drink reported less intimacy and less self-disclosure, and men who drank heavily frequently rated their interactions as less intimate than any other group of men or women. Nezlek et al. suggested that students who have some heavy drinking experiences (but not a great deal) appear most integrated into the college community. Thus extraversion/sociability may be related to drinking rates among college students, but less related to drinking problems. More research is needed to better specify the nature of this relationship.

#### *Neuroticism/emotionality*

The Brennan et al. (1986a) review also revealed mixed support for a relationship between drinking patterns of college students and anxiety, depression and other indices of emotional distress. Two studies were noted to find positive, but weak relationships between high neuroticism scores and frequency of drinking, but not quantity. Two different studies found relationships between extremely high scores on trait anxiety and negative consequences of drinking. These relationships were typically greater among female college students than among male college students. However, at least two studies reported the inverse relationship—that individuals who drank more frequently experienced less anxiety than those who drink less frequently. Brennan et al. (1986a) documented four studies showing a relationship between variables such as loneliness, frustration, depression and boredom and drinking frequency, quantity and consequences among female college students but not male college students.

More recently, Camatta and Nagoshi (1995) reported a positive correlation between stress, depression, “irrational” beliefs (thought to be a hallmark of depression) and alcohol-related problems. Regression analyses further suggested that the depression mediated the relationship between stress and alcohol-related problems. Although this study was limited by the convenience nature of the sample, and the fact that the sample was not balanced across gender, the multivariate analyses included measures of impulsiveness and venturesomeness, thus testing a model with both primary dimensions of personality present. Pullen (1994) also reported depression and state anxiety as predictors of drinking problems. Comorbidity between alcohol misuse

and depressive disorder was noted by Deykin et al. (1987) in a study of 424 college students. Based on retrospective self-report, the onset of depression was reported to precede the onset of alcohol misuse.

Alcohol may also be used to manage anxiety. Kushner and Sher (1993) documented increased comorbidity between anxiety and alcohol diagnoses. In this study, alcohol diagnoses were almost twice as likely among those with anxiety disorder compared with those without. This finding is particularly strong given that the research sample was selected as representative of students (not convenience) and that a diagnostic interview was used to assess anxiety disorders. Kushner et al. (1999) followed up with a longitudinal analysis after the same sample had been followed for 7 years. Results suggested reciprocal causal relationships over time. Having an anxiety disorder at either Year 1 or Year 4 significantly increased the likelihood of an alcohol disorder in Year 7. Similarly, the presence of an alcohol disorder in Year 1 or Year 4 significantly increased the likelihood of anxiety disorder in Year 7. It is noteworthy that this relationship may be specific to higher levels of anxiety (levels that result in clinical diagnoses). As noted above, studies are mixed with respect to moderate levels of social anxiety predicting alcohol use (Brennan et al., 1986a).

In the Brennan et al. (1986a) review, five studies documented a relationship between frequency and problems of drinking and lower self-esteem, although one study specifically tested for this relationship and did not find it (Ratliff and Burkhart, 1984). In the Brennan et al. (1986a) review, there was some suggestion that the relationship between self-esteem and drinking was stronger among females than males. More recent research by Corbin et al. (1996) replicated the relationship between increased drinking and lower self-esteem only among females. Walitzer and Sher (1996) followed this line of research with the same sample of college students noted above who were assessed annually over 4 years of college. Walitzer and Sher found that low self-esteem at baseline prospectively predicted alcohol use disorders at 3- and 4-year follow-up among women only. It is noteworthy that Walitzer and Sher tested and ruled out the reverse effect, that heavy drinking or drinking problems creates low self-esteem. The prospective and multivariate nature of the Walitzer and Sher study lends considerable confidence in the observed relationships. It is also noteworthy that alcohol-related problem diagnoses represent a more stringent test of a relationship between self-esteem and drinking problems than most studies that examine only drinking rates.

#### **Drinking Motives, Alcohol Expectancies and Perceived Norms**

A considerable amount of research has investigated cognitive factors in the prediction of individual differences in

drinking rates and associated problems. Drinking motives refers to the need or psychological function that alcohol consumption fulfills and are typically assessed by responses of students to questionnaires about their reasons for drinking. Different motives for drinking are thought to relate to primary psychological effects that are experienced with the consumption of alcohol. A related concept is that of alcohol expectancies, defined as specific beliefs about the behavioral, emotional and cognitive effects of alcohol. Alcohol expectancies are also typically assessed by questionnaires, which ask respondents to rate the likelihood and/or value of specific behaviors or feelings thought to occur with alcohol consumption. Perceived norms refer to ratings students make about the acceptability and typicality of various drinking behaviors. In essence, the assessment of perceived norms is an attempt to measure students' understanding of the social support and acceptance of drinking practices.

### *Drinking motives*

Brennan et al. (1986a) identified eight studies examining different motives for alcohol consumption among college students. Two general types of drinking motives typically emerge in studies of college students: drinking for social purposes and drinking for emotional escape or relief. In the Brennan et al. (1986a) review, five studies associated escape motives with increased drinking and related problems among college students. However, at least one study documented increased frequency of intoxication associated with motives to drink for "getting drunk" (Wechsler and Rohman, 1981).

More recent research suggests that both classes of motives are likely important, perhaps for different individuals for different types of outcomes. Haden and Edmundson (1991) reported that, in contrast to predictions of other drug use, alcohol use rates were better predicted by social motivation than by personal motivation (although both motivations were significant predictors of drinking within a regression model). Bradley et al. (1992) similarly reported that positive social motives were related to alcohol-related negative consequences, in addition to negative personal motives. A study by Billingham et al. (1993) suggests the presence of gender differences in the function of drinking motivations. Billingham et al. found more reasons for drinking that actually related to drinking categories (moderate versus heavy) for women than for men. For women, factors such as "drink to get drunk," "forget disappointments," "feel good" and "get along better on dates" all contributed to a multivariate discriminate analysis. For men, fewer factors emerged, and one, "drinking to get drunk," accounted for most of the multivariate prediction.

Cronin (1997) developed a "reasons for drinking" scale with three primary dimensions: social camaraderie, mood enhancement and tension reduction. Social camaraderie en-

tered first in regression models predicting drinking rates, but mood enhancement entered first in prediction of alcohol-related problems. In most models, all three motivations demonstrated unique predictive potential. Finally, Carey and Correia (1997) sought to use drinking motivations to understand the relationship between drinking rates and drinking-related problems among college students. Carey and Correia found that negative reinforcement motives accounted for variance in alcohol-related problems beyond that accounted for by drinking rates. Positive reinforcement motives did not significantly contribute to the multivariate analysis. The authors concluded, based on additional analyses, that both positive and negative reinforcement motives contribute both indirectly and directly to account for drinking problems. Gender did not interact with these effects.

It is noteworthy that none of the studies just described pertaining to drinking motives were longitudinal in design, and all used samples of convenience. Thus the generality and the potential causal nature of relationships between drinking motives and drinking rates and problems remain to be demonstrated. One recent longitudinal study is an exception, however. Perkins (1999) reported that stress-motivated drinking became relatively (to other motivations) more prevalent after college graduation, and at this later time is associated with increased drinking rates. Interestingly, this relationship appears sooner after college graduation for women than for men.

### *Alcohol expectancies*

In the last 10 years there has been considerable interest in how alcohol expectancies relate to the use and risks associated with drinking. It is thought that the cognitive representation of the effects of alcohol affects decisions and motivations to drink and may reveal more problematic or risky patterns of use. Considerable research has taken place with college students. Brown (1985) showed that alcohol expectancies yielded better predictive capacity for college drinking than did demographic variables. Further, social drinkers were shown to expect social enhancement from alcohol, whereas problem drinkers were more likely to expect tension reduction from alcohol. Thus alcohol expectancies not only increased the predictability of college drinking, but were differentially related to problematic and nonproblematic patterns of college drinking as well. Other studies using college samples and different methodologies found that heavier drinkers report more positive effects over all dimensions than lighter drinkers (Leigh, 1987; see also Bogart et al., 1995). Leigh and Stacy (1993) similarly reported that positive expectancy was a stronger predictor of rates of drinking than was negative expectancy. Werner et al. (1995) reported that heavier drinkers expected more positive effects on sociability and sexuality and expected less effects on cognitive and behavioral impairment. These

results are consistent with studies of expectancies that use a free recall method as opposed to questionnaires. To control for potential biases in forced-choice questionnaires, Wood et al. (1996) asked students to generate their own beliefs about expected alcohol effects. Subjective ratings of positivity of alcohol effects were related to drinking rates, but not problems. Importantly, the absolute number of expectancies listed by students was correlated with alcohol dependence symptoms. This finding is consistent with Stacy et al.'s (1994) suggestion that frequent experiences with alcohol influence the accessibility of thoughts about alcohol use and expected outcomes.

To test for possible causal relationships between alcohol use and beliefs about alcohol effects, there have been several recent attempts to use measures of expectancies to predict drinking among college students over time. In a study of 184 students who completed measures of drinking and expectancies during the freshman and junior years, Werner et al. (1995) reported that high-risk drinkers had the greatest positive expectations for alcohol effects at both time points. Participants who moved into a problem-drinking category had higher positive expectancies at both time points and developed less concern for negative outcomes over time. Carey (1995a) also used a brief prospective design, assessing drinking at 1-month intervals, and found that global positive expectancies prospectively predicted maximum daily quantity of drinking and that expectancies for sexual enhancement prospectively predicted frequency of drinking. Kidorf et al. (1995) studied alcohol expectancies in a prospective design over a 2-month period. Prospective prediction of beer consumption was found for expectancies of increased social assertiveness and global positive changes, but only among men.

Perhaps the most comprehensive prospective study of expectancies and college drinking as of this writing is that of Sher et al. (1996). In this sample, 458 college students, half of whom were COAs, were assessed annually over 4 years, beginning as college freshman. Four subscales of outcome expectancies were assessed (Tension Reduction, Social Lubrication, Activity Enhancement and Performance Enhancement) and used to measure a general construct of the strength of alcohol outcome expectancies. Drinking rates were assessed annually as well, using four measures of drinking quantity and frequency. Results suggested first that COAs report higher alcohol expectancies on all four scales and that expectancies generally decrease over 4 years of college. Prospective prediction of drinking rates from alcohol expectancies was demonstrated over the 4-year interval. This carefully conducted study also showed that the prospective prediction was generally invariant across COA status and gender.

Although the most consistent relationships have been found for global positive expectations, some specific expectancies have been linked to specific individuals. For ex-

ample, Mooney and Corcoran (1989), in a cross-sectional design, reported that expectancies for social assertion were associated with drinking rates only for those low in assertiveness. Several studies, typically with cross-sectional designs, have also sought to evaluate expectancies within broader matrices of predictive factors for college drinking. Wood et al. (1992) failed to find interactive effects between expectancies and perceived norms and reasons for drinking in the prediction of drinking. Cronin (1997), also using a cross-sectional design, demonstrated that reasons for drinking (motives) accounted for more variance in alcohol use measures than did expectancies for alcohol effects.

### *Perceived norms*

In the last several years, there has been considerable attention to social norms for alcohol use on college campuses. Following data indicating that peer use is a powerful predictor of individual use rates, and that heavy drinkers hold attitudes more accepting of heavy drinking, Perkins and Berkowitz (1986) noted that students, despite holding moderate attitudes about heavy drinking themselves, perceived the community norm of alcohol use as much more liberal than their own. This pattern of "pluralistic ignorance" was replicated by Prentice and Miller (1996), documenting that Princeton students perceived the average student to be more comfortable with campus drinking practices than they themselves were. Baer and colleagues (Baer and Carney, 1993; Baer et al., 1991) showed that students believed that normative drinking rates and drinking consequences not only were higher than their own, but higher than they actually were when measured independently. This discrepancy has been documented in ratings of alcohol and other substance use in a large multicollge sample (Perkins et al., 1999).

There is some evidence that normative perceptions are an individual risk factor for heavy drinking; that is, that higher perceived norms are associated with higher levels of drinking and problems (Perkins and Wechsler, 1996; Thombs et al., 1997; Wood et al., 1992). Not all studies document this relationship, including one specifically designed to test it (Baer and Carney, 1993). One study (Wood et al., 1992) showed that perceived social norms for drinking were independently related to drinking rates but not drinking-related problems, when tested within a multivariate model that included measures of drinking motives and alcohol expectancies. Perkins and Wechsler (1996) reported that perceived norms for alcohol use predicted alcohol misuse most strongly among students who also endorsed liberal attitudes about drinking. Thus perceived norms for drinking may justify or exacerbate heavy drinking only under conditions where more accepting social attitudes already exist. Research is needed to continue to refine the

measurement of perceptions of drinking norms and to better understand what social and individual factors lead to their development. Continued research is needed to document that perceived norms independently predict heavy and risky drinking with longitudinal designs.

### **Social Affiliation**

Peer use is perhaps the strongest predictor of adolescent alcohol use (Bucholz, 1990; Jacob and Leonard, 1994). The college years are commonly marked by social activity, and much of the alcohol used on college campuses is consumed at small and large parties. Thus research into individual differences in drinking on college campuses has begun to focus on both the assessment and prediction of social activities in understanding drinking behavior. It is noteworthy that the study of social activities necessarily combines studies of factors at the individual level (i.e., the social organizations that students select and maintain) and factors that exist at a more social level (i.e., the effects of social organizations on their participants).

#### *Social context*

*Social context* is a term that is used to attempt to characterize social and psychological environments where drinking takes place, and in so doing attempt to measure the interaction of interpersonal, temporal and situation factors (Thombs et al., 1997). Social contexts for drinking naturally vary with respect to participants' age, gender, living situation, work and so on and thus hold promise for capturing differences and similarities in drinking practices in specific venues like college campuses.

Drinking contexts can be described without psychological features, but simply by the size and the composition of participants. Rosenbluth et al. (1978), for example, reported that larger drinking groups were associated with greater consumption of alcohol. Perkins and Berkowitz (1986) also noted this pattern. More recently, Senchak et al. (1998) evaluated social contexts of drinking with respect to the size and gender makeup of social drinking events on college campuses. Both group size and gender differences were observed. Men reported greater frequency of drunkenness in large groups of mixed sex and small groups of same sex individuals compared with small mixed sex groups. Women's frequency of drunkenness was unrelated to gender mix or group size. It appears that women's presence in small groups may moderate male consumption. It is noteworthy in this study that men and women who reported drinking in large mixed sex groups were less depressed and less socially avoidant than those who preferred small groups, although depression and social avoidance did not account for differences in drinking in different social contexts. Differences in drinking as a function of context also

could not be accounted for by alcohol expectancies or measures of masculinity/femininity or youthful deviance.

Several researchers have recently sought to go beyond the assessment of drinking context size and composition and assess psychological and social factors present in drinking contexts. At least two different measures have been developed to assess drinking contexts specifically among college students. Thombs and Beck (1994) developed a Social Context of Drinking Scale with subscales assessing Social Facilitation, Emotional Pain, Peer Acceptance, Family, Sex Seeking and Motor Vehicle. O'Hare (1997) developed a 23-item Drinking Context Scale, with three subfactors assessing Convivial Drinking, Private Intimate Drinking and Negative Coping. Thombs et al. (1997) reported that the drinking context of social facilitation was strongly associated with a measure of drinking intensity. Contexts of sex seeking and emotional pain also contributed to multivariate prediction. Beck et al. (1995) showed that drinking for social facilitation and disinhibition were important discriminators between higher and lower intensity drinkers in both genders. However, for women, drinking in the context of emotional pain further discriminated between higher and lower intensity drinkers. Perhaps due to conceptual proximity to actual drinking behavior, drinking context scales for college students have been shown to be better predictors of drinking than are measures of personality (Beck et al., 1995) and alcohol expectancies (Thombs et al., 1993).

Carey (1993) reported that contexts for college drinking are specific rather than general. Carey showed that heavy drinkers in a college sample differed from moderate drinkers in their ratings of the frequency of drinking in four of eight types of drinking situations. The situations that did differentiate between the groups were social pressure to drink, pleasant times, pleasant emotions and physical discomfort. Carey (1995b) replicated and extended this line of research, showing that situation ratings were associated with drinking problems as well as rates. It is noteworthy that Carey (1995b) observed no gender differences in the relationship between situation ratings and drinking problems.

#### *Activities and organizations*

Several studies have examined variation in student drinking as a function of the types of activities and organizations in which students participate. Some of these activities are quite public and highly visible (e.g., athletics) and thus attract a fair amount of attention from administrators. Where students live also affects drinking. Students living at home with parents tend to drink less (Valliant and Scanlan, 1996). Residence in dormitories has also been associated with increased drinking in larger population studies (Barnes et al., 1992; Gfroerer et al., 1997).

There are strong data suggesting that members of Greek social organizations, fraternities and sororities drink more

heavily and more frequently than other students (Cashin et al., 1998; Engs et al., 1996; Wechsler et al., 1995). In the Cashin et al. (1998) study of more than 25,000 students from 61 institutions, students affiliated with Greek system organizations reported greater frequency of drinking, greater quantity of drinking and more negative consequences related to use compared with students not affiliated with Greek organizations. Members of Greek organizations felt that alcohol was a vehicle for friendship, social activity and sexuality in greater numbers than did comparison nonmembers. Further, the leadership within Greek organizations drank as much or more than did average members, suggesting that leadership may set heavy drinking norms. Indeed, some studies of biased perceptions of behavioral norms were conducted among members of Greek houses (Baer and Carney, 1993; Baer et al., 1991). Fraternities also appear to accept higher levels of drinking as normal (Baer, 1994). Fraternity membership is associated with initiation of drinking among that subset of students who do not already drink on entry into college (Lo and Globetti, 1993). In Wechsler et al.'s (1995) study, membership in a fraternity was the strongest predictor of the frequency of heavy drinking in a final logistic regression of 18 risk factors. It is noteworthy that studies of Engs et al. (1996), Cashin et al. (1998) and Wechsler et al. (1995) all involve questionnaire data from multiple colleges, thus increasing confidence of the generalizability of the finding. Finally, Sher et al. (2001) have recently shown with their longitudinal study that heavy drinking associated with membership in fraternities and sororities does not persist in the years after college. Given the time-limited nature of drinking in these social organizations, and controlling for individual drinking levels when entering the social organizations, led Sher et al. (2001) to argue that social normative processes appear critical for students in these contexts.

Data from two different multicampus data sets also suggest that college students involved in athletics drink more frequently than other students. Based on the Core Survey, Lechlitter et al. (1998) reported on responses of more than 50,000 students from 125 institutions. Both male and female college students who were also athletes drank more heavily, drank more frequently and reported more negative consequences from drinking compared with nonathletes. Lechlitter et al. further found that male leaders of athletic teams drank at a rate higher than that of other team members. In the Wechsler et al. (1995) study of 140 colleges, response to the item "athletics are important" was associated with increased rates of heavy drinking, even when controlling for other risk factors.

It is noteworthy that, although members of athletic and Greek organizations have been shown to drink more than other students, little is known about how members of these organizations differ from other students on other dimensions. Heavy drinking is not found uniformly in all Greek

organizations; students in some organizations drink considerably more than students in other organizations (Harrington et al., 1997). Leibsohn (1994) noted, for example, that students entering college selected friends who drank in a similar manner. There is some evidence that high school students who plan to join fraternities drink more than their peers who do not plan to join (Baer et al., 1995). Yet in this same study the drinking of fraternity members increased more than did the drinking of others on entry to college. It is likely that drinking is influenced both by selection of social organizations and by socialization within organizations. Sher et al.'s (2001) recent study suggests that heavy drinking occurs in Greek houses independent of selection processes and provides some hope that such heavy drinking is limited to the time period in college when social norms for drinking are elevated.

### *Drinking games*

Researchers have recently begun to study a specific social interaction common on college campuses, the "drinking game." Drinking games involve a set of rules that typically define when and how much participants must drink. Most rules are designed to ensure large consumption of alcohol (Newman et al., 1991). Participants in such games report increased levels of drinking and drinking-related problems compared with nonparticipants (Engs and Hansen, 1993; Wood et al., 1992). Yet, in one descriptive study, once general alcohol use rates are controlled, game playing did not contribute to the prediction of alcohol-related problems (Nagoshi et al., 1994). Nagoshi et al. found that game participation was related to celebratory reasons for drinking, use of marijuana and impulsivity. Johnson et al. (1998), via questionnaires completed by college undergraduates, reported that greater frequency of play was associated with lower social anxiety. Alcohol expectancies were not found to moderate this relationship. In a follow-up study, Johnson et al. (1999) developed an assessment of specific reasons for game playing and found that game playing was associated with a desire for celebration and a desire to meet potential sexual partners.

### **Summary and Commentary**

The goal of this review was to examine research on individual factors in relation to alcohol consumption among college students. Research before 1985 was summarized in a comprehensive review published in 1986 (Brennan et al., 1986a,b), which creates a natural point of reference. Initial pre-1986 research into individual differences in college student drinking focused on traditional aspects of personality to explain why some students drink more than others. Drinking motives were examined as a way of understanding different needs that alcohol might fulfill. Few multivariate

hypotheses were tested. In general terms, a pattern of behavior characterized by sensation seeking, impulsivity and nonconventionality consistently related to increased drinking. There was also evidence of a smaller factor of stress and affect relief drinking among college students, although studies are more mixed in support of this dimension. Drinking for stress and relief of negative affect was more consistently noted among females. Early studies of drinking motives tended to suggest that personal, emotion-coping motives were more strongly related to problems with alcohol than were social motives for drinking. Membership in Greek social organizations and social activities in large groups were associated with increased drinking.

Research since 1985 is highly variable in quality; many studies still rely on questionnaires at one point in time and ignore multivariate models of risk of alcohol-related problems, whereas other studies have become somewhat more sophisticated. Several recent reports assess multiple dimensions of drinking behavior and test multivariate relationships. In the last 15 years, new dimensions of individual differences have been developed and assessed, including expectancies of alcohol effects, better measures of drinking motivation, assessment of perceived norms for drinking and assessment of drinking contexts. It has now become the norm to assess both drinking rates and drinking problems. Further, there are now at least three large, cross-institution data sets that can address student factors (Meilman et al., 1998). Relationships documented with these data sets lend considerably more confidence to results than those found with studies from single institutions and based on samples of convenience. Perhaps most importantly, recently a few well-designed longitudinal studies have been completed that better address causal inferences (albeit most of the longitudinal studies are from one data set in Missouri).

It is noteworthy, of course, that even large, multicampus data sets can be biased based on who tends to complete questionnaires at various institutions. Even recent large studies of college students do not attempt nor document representative sampling across different demographic and social dimensions of college populations (Meilman et al., 1998). Thus what we know about student factors and drinking for the most part is limited to those who complete questionnaires. Studies of representative samples of college populations remain sorely needed.

Results of research conducted in the past 15 years are consistent with those that came earlier. For example, results from personality research showing a strong relationship between impulsivity and drinking are supported by research on drinking motives and drinking expectancies, as well as drinking contexts. An impulsive/sensation-seeking style seems manifest in the reporting of positive social motives, expecting greater positive effects from alcohol and participating in drinking games. Research has not yet directly linked personality dimensions of sensation seeking/

impulsivity to specific drinking motives, expectancies and game playing, but some evidence provides linkage, and the confluence seems likely. A second general pattern of drinking, one that is associated with stress and emotional coping, also is supported by research on drinking motives, expectancies, self-esteem and drinking contexts. Furthermore, anxiety disorders have been shown to be comorbid with alcohol disorders among college students, from both cross-sectional and longitudinal designs. This pattern of drinking likely constitutes a relatively smaller proportion of college drinking than that associated with socializing and impulsivity, but should not be overlooked. At least one longitudinal study has demonstrated prospective reciprocal relationships between alcohol diagnoses and anxiety diagnoses years after college. Thus alcohol use associated with managing anxious affective states may contribute to long-standing adjustment problems. Longitudinal relationships with drinking have not been demonstrated with more common and socially based motives for drinking.

Research further suggests that sociability and extraversion may have a specific role in the etiology of drinking within the college context. This is noteworthy because sociability does not consistently relate to drinking problems in other, noncollege populations (Sher and Trull, 1994; Wood et al., 2001). Data showing the strong effects of social organizations on drinking, as well as personality assessment, suggest this conclusion. Sociability and extraversion may also at least partially explain why college students, temporarily, drink more than their noncollege peers (Schulenberg et al., 2001).

The consistent assessment of both drinking rates and drinking problems has not, to date, revealed simple conclusions about differences in the prediction of rates and problems. In summary, both impulsive/sensation-seeking type drinking and stress/anxiety-based drinking are associated with both increased drinking rates and increased negative consequences. There is some evidence that stress/anxiety-based drinking is associated with long-term and more severe negative outcomes. Yet even highly social drinking results in negative consequences for college students. Future research should examine if different drinking motives result in different types of drinking problems. Such research necessitates the development of assessment techniques that can reliably differentiate among various negative consequences experienced within college contexts.

It is tempting to call for more multivariate research that tests theoretical and mediation models among the array of etiologic factors reviewed above. The dimensions or levels of individual variation reviewed above may interrelate in complex ways. For example, social contexts that students select or are exposed to may have powerful effects on attitudes and on drinking behavior. Dimensions of personality, such as a tendency toward sensation seeking, may relate not only to drinking but to the choice of drinking partners

as well. Research that integrates these various levels of influence and dimensions of behavior is needed. Further, multivariate models should also be developed and interpreted in combination with other broader social factors reviewed elsewhere. For example, it may be that students who reside in certain microsocial settings (i.e., fraternities) or individuals characterized by a certain personality style (i.e., sensation seekers) are least affected by broader social factors (i.e., price and availability constraints).

Some of this research has already begun. In the last 15 years, several researchers have begun testing multivariate or interactive models of individual differences among college students, for example, by examining demographic factors, drinking motives, expectancies and personality simultaneously and statistically controlling for multiple effects. Some intriguing interactive effects have been noted in the literature. For example, religiosity may be more protective against heavy drinking when or where social mores are most ambiguous (Perkins, 1994). Multivariate research also has addressed the uniqueness of factors being studied, for example, by showing that motives are to some extent distinct from expectancies.

To date, however, multivariate research efforts have for the most part not produced evidence of powerful interaction or mediation among constructs. Most multivariate research reviewed above tends to show that when various theoretical predictive factors are tested simultaneously, each carries unique predictive capacity (Bradley et al., 1992; Clapper et al., 1994; Cronin, 1997; Engs et al., 1996; Evans and Dunn, 1995; MacDonald et al., 1991; Pullen, 1994; Thombs et al., 1997; Wechsler et al., 1995; Wood et al., 1992). Although such results could be artifactual based on sampling and the nature of questionnaires, it is also likely that each of the "explanatory" factors contributes to the prediction of heavy drinking, but is not a simple or central predictive factor in and of itself. Strong models of mediation have not to date been supported in the literature with college students.

Future research efforts on student factors also should attend to developmental models of drinking as a method to specify dependent measures. In particular, Zucker and colleagues (Zucker, 1987, 1994; Zucker et al., 1995), in proposing a multivariate and integrative model of alcoholism risk, suggested that different types of "alcoholisms" are associated with different etiologic processes. Three central types of developmental paths are proposed to account for common courses. The first, "sociopathic alcoholism," is characterized by early onset, high sociopathy, criminality and high severity of drinking problems. This pattern of drinking problems may be strongly genetically influenced and associated with personality patterns of impulsivity and sensation seeking, begin early and follow a chronic course. A second pattern of "developmentally limited" alcohol-related problems is also proposed, consistent with epide-

miological data showing that heavy drinking in adolescents is associated with other delinquent behavior, but is commonly limited in time, diminishing significantly on the transition to young adulthood. This second pattern is likely associated with impulsivity (to a lesser degree than the sociopathic type) as well as extraversion. "Negative affect alcoholism," alcohol-related problems related to depressive and anxious symptomatology, is a third developmental path. It is thought to begin later in life, develop more slowly and be less associated with adolescence in general and delinquent behavior in specific. Zucker et al. (1995) suggested that in each case environmental processes (stress, lack of essential parenting, availability of alcohol) and/or biological processes (temperament, physiologic sensitivity) facilitate the development of problems (see also Tarter and Vanyukov, 1994).

Taken as a whole, the research literature with college students suggests that the first developmental trajectory (sociopathic) may not be common on college campuses. The key endpoints, high levels of dependence and high criminality, do not appear as dependent measures in the college drinking literature. Genetic effects, although likely present in college populations, may be limited in magnitude, and the chronicity and severity of drinking problems associated with sociopathic trajectories are not documented. It is likely that many of these individuals never achieve college entrance. Thus a search for the individual with severe alcohol-related problems and high sociopathy among current college students will be generally unsuccessful and will miss much of the problematic drinking that does exist.

In contrast, the second pattern of developmentally limited alcohol-related problems may account for much of the drinking found on college campuses. Relationships between drinking and impulsive expression, deviance, alcohol expectancies and drinking contexts support this conclusion. That college drinking is associated with sociability and extraversion also fits well within a model of developmentally limited alcohol-related problems. A developmentally limited model of college drinking is also consistent with data documenting that heavy drinking does not generally persist into postcollege roles (Donovan et al., 1983; Jessor et al., 1991).

Negative affect alcoholism, alcohol-related problems related to depressive and anxious symptomatology, also appears to be represented in college samples and, although less common, may carry greater risk for chronic problems over the long term. There is some albeit inconsistent evidence that drinking motives associated with management of negative affect are associated with greater problems. Longitudinal studies also document reciprocal prediction of anxiety diagnoses and alcohol diagnoses.

As just described, the now large literature on the etiology of drinking problems can be conceptually summarized by examining covariation in several risk factors and by as-

sessing patterns of change over time. It is likely that the population of college drinkers represent several different patterns of drinking with different developmental trajectories. The research on college student drinking too often examines only one point in time and thus does not relate research findings to possible developmental processes. Some central issues remain unexplored. For example, is variability in college drinking time limited or enduring over years? For whom? What constellation of etiologic factors predicts different patterns of drinking over time? What types of settings constrain drinking for what types of students? Through what kinds of social influence processes? A better understanding of the processes that lead to problems for certain individuals in certain settings will develop through exploration of these questions. Further, with an understanding of risk factors in contexts, administrators and health professionals will be better able to identify and reach those most in need of services and adjust the content of prevention programs for maximum effectiveness.

### References

- ALTERMAN, A.I., SEARLES, J.S. AND HALL, J.G. Failure to find differences in drinking behavior as a function of familial risk for alcoholism: A replication. *J. Abnorm. Psychol.* **98**: 50-53, 1989.
- ARNETT, J.J. Sensation seeking, aggressiveness, and adolescent reckless behavior. *Pers. Individ. Diff.* **20**: 693-702, 1996.
- BAER, J.S. Effects of college residence on perceived norms for alcohol consumption: An examination of the first year in college. *Psychol. Addict. Behav.* **8**: 43-50, 1994.
- BAER, J.S. AND CARNEY, M.M. Biases in the perceptions of the consequences of alcohol use among college students. *J. Stud. Alcohol* **54**: 54-60, 1993.
- BAER, J.S., MACLEAN, M.G. AND MARLATT, G.A. Linking etiology and treatment for adolescent substance abuse: Toward a better match. In: JESSOR, R. (Ed.) *New Perspectives on Adolescent Risk Behavior*, New York: Cambridge Univ. Press, 1998, pp. 182-220.
- BAER, J.S., NOVICK, N.J. AND HUMMEL-SCHLUGER, A.O. Task persistence after alcohol consumption among children of alcoholics. *Alcsm Clin. Exp. Res.* **19**: 955-960, 1995.
- BAER, J.S., STACY, A. AND LARIMER, M. Biases in the perception of drinking norms among college students. *J. Stud. Alcohol* **52**: 580-586, 1991.
- BARNES, G.M., WELTE, J.W. AND DINTCHEFF, B. Alcohol misuse among college students and other young adults: Findings from a general population study in New York State. *Int. J. Addict.* **27**: 917-934, 1992.
- BAUMRIND, D. The influence of parenting style on adolescent competence and substance use. *J. Early Adolesc.* **11**: 56-95, 1991.
- BECK, K.H., THOMBS, D.L., MAHONEY, C.A. AND FINGAR, K.M. Social context and sensation seeking: Gender differences in college student drinking motivations. *Int. J. Addict.* **30**: 1101-1115, 1995.
- BILLINGHAM, R.E., PARRILLO, A.V. AND GROSS, W.C. Reasons given by college students for drinking: A discriminant analysis investigation. *Int. J. Addict.* **28**: 793-802, 1993.
- BOGART, C.J., YEATMAN, F.R., SIRRIDGE, S.T. AND GEER, F.A. Alcohol expectancies and the personal and parental drinking patterns of women. *Women Hlth* **22** (4): 51-66, 1995.
- BRADLEY, J.R., CARMAN, R.S. AND PETREE, A. Personal and social drinking motives, family drinking history, and problems associated with drinking in two university samples. *J. Drug Educ.* **22**: 195-202, 1992.
- BRENNAN, A.F., WALFISH, S. AND AUBUCHON, P. Alcohol use and abuse in college students: I. A review of individual and personality correlates. *Int. J. Addict.* **21**: 449-474, 1986a.
- BRENNAN, A.F., WALFISH, S. AND AUBUCHON, P. Alcohol use and abuse in college students: II. Social/environmental correlates, methodological issues, and implications for intervention. *Int. J. Addict.* **21**: 475-493, 1986b.
- BROWN, S.A. Expectancies versus background in the prediction of college drinking patterns. *J. Cons. Clin. Psychol.* **53**: 123-130, 1985.
- BUCHOLZ, K.K. A review of correlates of alcohol use and alcohol problems in adolescence. In: GALANTER, M. (Ed.) *Recent Developments in Alcoholism*, Vol. 8: Combined Alcohol and Other Drug Dependence, New York: Plenum Press, 1990, pp. 111-123.
- CAMATTA, C.D. AND NAGOSHI, C.T. Stress, depression, irrational beliefs, and alcohol use and problems in a college student sample. *Alcsm Clin. Exp. Res.* **19**: 142-146, 1995.
- CAREY, K.B. Situational determinants of heavy drinking among college students. *J. Counsel. Psychol.* **40**: 217-220, 1993.
- CAREY, K.B. Alcohol-related expectancies predict quantity and frequency of heavy drinking among college students. *Psychol. Addict. Behav.* **9**: 236-241, 1995a.
- CAREY, K.B. Heavy drinking contexts and indices of problem drinking among college students. *J. Stud. Alcohol* **56**: 287-292, 1995b.
- CAREY, K.B. AND CORREIA, C.J. Drinking motives predict alcohol-related problems in college students. *J. Stud. Alcohol* **58**: 100-105, 1997.
- CASHIN, J.R., PRESLEY, C.A. AND MEILMAN, P.W. Alcohol use in the Greek system: Follow the leader? *J. Stud. Alcohol* **59**: 63-70, 1998.
- CLAPPER, R.L., MARTIN, C.S. AND CLIFFORD, P.R. Personality, social environment, and past behavior as predictors of late adolescent alcohol use. *J. Subst. Abuse* **6**: 305-313, 1994.
- COLDER, C.R. AND CHASSIN, L. Differentiating "substance use" from "problem substance use" in adolescents: Data from a study of adolescents at risk. Paper presented at the annual meeting of the American Psychological Association, Washington, DC, August 1992.
- CORBIN, W.R., MCNAIR, L.D. AND CARTER, J. Self-esteem and problem drinking among male and female college students. *J. Alcohol Drug Educ.* **42**: 1-14, 1996.
- CRONIN, C. Reasons for drinking versus outcome expectancies in the prediction of college student drinking. *Subst. Use Misuse* **32**: 1287-1311, 1997.
- DARKES, J., GREENBAUM, P.E. AND GOLDMAN, M.S. Sensation seeking—disinhibition and alcohol use: Exploring issues of criterion contamination. *Psychol. Assess.* **10**: 71-76, 1998.
- DEYKIN, E.Y., LEVY, J.C. AND WELLS, V. Adolescent depression, alcohol and drug abuse. *Amer. J. Publ. Hlth* **77**: 178-182, 1987.
- DONOVAN, J.E., JESSOR, R. AND JESSOR, L. Problem drinking in adolescence and young adulthood. *J. Stud. Alcohol* **44**: 109-137, 1983.
- EARLEYWINE, M., FINN, P.R. AND MARTIN, C.S. Personality risk and alcohol consumption: A latent variable analysis. *Addict. Behav.* **15**: 183-187, 1990.
- ENGS, R.C. Family background of alcohol abuse and its relationship to alcohol consumption among college students: An unexpected finding. *J. Stud. Alcohol* **51**: 542-547, 1990.
- ENGS, R.C., DIEBOLD, B.A. AND HANSON, D.J. The drinking patterns and problems of a national sample of college students, 1994. *J. Alcohol Drug Educ.* **41**: 13-33, 1996.
- ENGS, R.C. AND HANSON, D.J. Drinking games and problems related to drinking among moderate and heavy drinkers. *Psychol. Rep.* **73**: 115-120, 1993.
- EVANS, D.M. AND DUNN, N.J. Alcohol expectancies, coping responses and self-efficacy judgments: A replication and extension of Cooper et al.'s 1988 study in a college sample. *J. Stud. Alcohol* **56**: 186-193, 1995.
- FROMME, K. AND RUELA, A. Mediators and moderators of young adults' drinking. *Addiction* **89**: 63-71, 1994.

- GEORGE, W.H., LAMARR, J., BARRETT, K. AND MCKINNON, T. Alcoholic parentage, self-labeling, and endorsement of ACOA-codependent traits. *Psychol. Addict. Behav.* **13**: 36-48, 1999.
- GFROERER, J.C., GREENBLATT, J.C. AND WRIGHT, D.A. Substance use in the U.S. college-age population: Differences according to educational status and living arrangement. *Amer. J. Publ. Hlth* **87**: 62-65, 1997.
- GONZALEZ, G.M. Early onset of drinking as a predictor of alcohol consumption and alcohol-related problems in college. *J. Drug Educ.* **19**: 225-230, 1989.
- GREENFIELD, T.K., GUYDISH, J. AND TEMPLE, M.T. Reasons students give for limiting drinking: A factor analysis with implications for research and practice. *J. Stud. Alcohol* **50**: 108-115, 1989.
- HADEN, T.L. AND EDMUNDSON, E.W. Personal and social motivations as predictors of substance use among college students. *J. Drug Educ.* **21**: 303-312, 1991.
- HARRINGTON, N.G., BRIGHAM, N.L. AND CLAYTON, R.R. Differences in alcohol use and alcohol-related problems among fraternity and sorority members. *Drug Alcohol Depend.* **47**: 237-246, 1997.
- HAVEY, J.M. AND DODD, D.K. Variables associated with alcohol abuse among self-identified collegiate COAs and their peers. *Addict. Behav.* **18**: 567-575, 1993.
- HECK, E.J. AND WILLIAMS, M.D. Criterion variability in problem-drinking research on college students. *J. Subst. Abuse* **7**: 437-447, 1995.
- JACOB, T. AND LEONARD, K. Family and peer influences in the development of adolescent alcohol abuse. In: ZUCKER, R., BOYD, G. AND HOWARD, J. (Eds.) *The Development of Alcohol Problems: Exploring the Biopsychosocial Matrix of Risk*. NIAAA Research Monograph No. 26, NIH Publication No. 94-3495, Rockville, MD: Department of Health and Human Services, 1994, pp. 123-155.
- JESSOR, R., DONOVAN, J.E. AND COSTA, F.M. *Beyond Adolescence: Problem Behavior and Young Adult Development*, New York: Cambridge Univ. Press, 1991.
- JOHNSON, P.B. Personality correlates of heavy and light drinking college students. *J. Alcohol Drug Educ.* **34** (2): 33-37, 1989.
- JOHNSON, T.J., HAMILTON, S. AND SHEETS, V.L. College students' self-reported reasons for playing drinking games. *Addict. Behav.* **24**: 279-286, 1999.
- JOHNSON, T.J., WENDEL, J. AND HAMILTON, S. Social anxiety, alcohol expectancies, and drinking-game participation. *Addict. Behav.* **23**: 65-79, 1998.
- JOHNSTON, L.D., O'MALLEY, P.M. AND BACHMAN, J.G. *National Survey Results on Drug Use from the Monitoring the Future Study, 1975-1994*, Vol. 1, NIH Publication No. 95-4026, Washington: Government Printing Office, 1995.
- JUNG, J. Parent-child closeness affects the similarity of drinking levels between parents and their college-age children. *Addict. Behav.* **20**: 61-67, 1995.
- KIDORF, M., SHERMAN, M.F., JOHNSON, J.G. AND BIGELOW, G.E. Alcohol expectancies and changes in beer consumption of first-year college students. *Addict. Behav.* **20**: 225-231, 1995.
- KUSHNER, M.G. AND SHER, K.J. Comorbidity of alcohol and anxiety disorders among college students: Effects of gender and family history of alcoholism. *Addict. Behav.* **18**: 543-552, 1993.
- KUSHNER, M.G., SHER, K.J. AND ERICKSON, D.J. Prospective analysis of the relation between DSM-III anxiety disorders and alcohol use disorders. *Amer. J. Psychiat.* **156**: 723-732, 1999.
- LEIBSOHN, J. The relationship between drug and alcohol use and peer group associations of college freshmen as they transition from high school. *J. Drug Educ.* **24**: 177-192, 1994.
- LEIBSOHN, M.T., OETTING, E.R. AND DEFFENBACHER, J.L. Effects of trait anger on alcohol consumption and consequences. *J. Child Adolesc. Subst. Abuse* **3** (3): 17-32, 1994.
- LEICHLITER, J.S., MEILMAN, P.W., PRESLEY, C.A. AND CASHIN, J.R. Alcohol use and related consequences among students with varying levels of involvement in college athletics. *J. Amer. Coll. Hlth* **46**: 257-262, 1998.
- LEIGH, B.C. Beliefs about the effects of alcohol on self and others. *J. Stud. Alcohol* **48**: 467-475, 1987.
- LEIGH, B.C. AND STACY, A.W. Alcohol outcome expectancies: Scale construction and predictive utility in higher order confirmatory models. *Psychol. Assess.* **5**: 216-229, 1993.
- LO, C.C. AND GLOBETTI, G. A partial analysis of the campus influence on drinking behavior: Students who enter college as nondrinkers. *J. Drug Issues* **23**: 715-725, 1993.
- MACDONALD, R., FLEMING, M.F. AND BARRY, K.L. Risk factors associated with alcohol abuse in college students. *Amer. J. Drug Alcohol Abuse* **17**: 439-449, 1991.
- MARTSH, C.T. AND MILLER, W.R. Extraversion predicts heavy drinking in college students. *Pers. Individ. Diff.* **23**: 153-155, 1997.
- MEILMAN, P.W., CASHIN, J.R., MCKILLIP, J. AND PRESLEY, C.A. Understanding the three national databases on collegiate alcohol and drug use. *J. Amer. Coll. Hlth* **46**: 159-162, 1998.
- MOONEY, D.K. AND CORCORAN, K.J. The relationship between assertiveness, alcohol-related expectations for social assertion and drinking patterns among college students. *Addict. Behav.* **14**: 301-305, 1989.
- NAGOSHI, C.T., WOOD, M.D., COTE, C.C. AND ABBIT, S.M. College drinking game participation within the context of other predictors of alcohol use and problems. *Psychol. Addict. Behav.* **8**: 203-213, 1994.
- NEWMAN, I.M., CRAWFORD, J.K. AND NELLIS, M.J. The role and function of drinking games in a university community. *J. Amer. Coll. Hlth* **39**: 171-175, 1991.
- NEZLEK, J.B., PILKINGTON, C.J. AND BILBRO, K.G. Moderation in excess: Binge drinking and social interaction among college students. *J. Stud. Alcohol* **55**: 342-351, 1994.
- O'HARE, T. Measuring excessive alcohol use in college drinking contexts: The Drinking Context Scale. *Addict. Behav.* **22**: 469-477, 1997.
- PATOCK-PECKHAM, J.A., HUTCHINSON, G.T., CHEONG, J. AND NAGOSHI, C.T. Effect of religion and religiosity on alcohol use in a college student sample. *Drug Alcohol Depend.* **49**: 81-88, 1998.
- PERKINS, H.W. The contextual effect of secular norms on religiosity as moderator of student alcohol and other drug use. *Res. Social Sci. Stud. Relig.* **6**: 187-208, 1994.
- PERKINS, H.W. Stress-motivated drinking in collegiate and postcollegiate young adulthood: Life course and gender patterns. *J. Stud. Alcohol* **60**: 219-227, 1999.
- PERKINS, H.W. AND BERKOWITZ, A.D. Perceiving the community norms of alcohol use among students: Some research implications for campus alcohol education programming. *Int. J. Addict.* **21**: 961-976, 1986.
- PERKINS, H.W. AND BERKOWITZ, A.D. Collegiate COAs and alcohol abuse: Problem drinking in relation to assessments of parent and grandparent alcoholism. *J. Counsel. Devel.* **69**: 237-240, 1991.
- PERKINS, H.W., MEILMAN, P.W., LEICHLITER, J.S., CASHIN, J.R. AND PRESLEY, C.A. Misperceptions of the norms for the frequency of alcohol and other drug use on college campuses. *J. Amer. Coll. Hlth* **47**: 253-258, 1999.
- PERKINS, H.W. AND WECHSLER, H. Variation in perceived college drinking norms and its impact on alcohol abuse: A nationwide study. *J. Drug Issues* **26**: 961-974, 1996.
- POULSON, R.L., EPLER, M.A., SATTERWHITE, T.N., WUENSCH, K.L. AND BASS, L.A. Alcohol consumption, strength of religious beliefs, and risky sexual behavior in college students. *J. Amer. Coll. Hlth* **46**: 227-232, 1998.
- PRENTICE, D.A. AND MILLER, D.T. Pluralistic ignorance and the perpetuation of social norms by unwitting actors. *Adv. Exp. Social Psychol.* **28**: 161-209, 1996.
- PULLEN, L.M. The relationships among alcohol abuse in college students and selected psychological/demographic variables. *J. Alcohol Drug Educ.* **40** (1): 36-50, 1994.
- RATLIFF, K.G. AND BURKHART, B.R. Sex differences in motivations for and effects of drinking among college students. *J. Stud. Alcohol* **45**: 26-32, 1984.

- RODNEY, H.E. AND RODNEY, L. An exploratory study of African American collegiate adult children of alcoholics. *J. Amer. Coll. Hlth* **44**: 267-272, 1996.
- ROSENBLUTH, J., NATHAN, P.E. AND LAWSON, D.M. Environmental influences on drinking by college students in a college pub: Behavioral observation in the natural environment. *Addict. Behav.* **3**: 117-121, 1978.
- SCHULENBERG, J., MAGGS, J.L., LONG, S.W., SHER, K.J., GOTHAM, H.J., BAER, J.S., KIVLAHAN, D.R., MARLATT, G.A. AND ZUCKER, R.A. The problem of college drinking: Insights from a developmental perspective. *Alcsm Clin. Exp. Res.* **25**: 473-477, 2001.
- SENCIAK, M., LEONARD, K.E. AND GREENE, B.W. Alcohol use among college students as a function of their typical social drinking context. *Psychol. Addict. Behav.* **12**: 62-70, 1998.
- SHER, K.J., BARTHOLOW, B.D. AND NANDA, S. Short- and long-term effects of fraternity and sorority membership on heavy drinking: A social norms perspective. *Psychol. Addict. Behav.* **15**: 42-51, 2001.
- SHER, K.J. AND TRULL, T.J. Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. *J. Abnorm. Psychol.* **103**: 92-102, 1994.
- SHER, K.J., TRULL, T.J., BARTHOLOW, B.D. AND VIETH, A. Personality and alcoholism: Issues, methods, and etiological processes. In: LEONARD, K.E. AND BLANE, H.T. (Eds.) *Psychological Theories of Drinking and Alcoholism*, 2nd Edition, New York: Guilford Press, 1999, pp. 54-105.
- SHER, K.J., WOOD, M.D., WOOD, P.K. AND RASKIN, G. Alcohol outcome expectancies and alcohol use: A latent variable cross-lagged panel study. *J. Abnorm. Psychol.* **105**: 561-574, 1996.
- STACY, A.W., LEIGH, B.C. AND WEINGARDT, K.R. Memory accessibility and association of alcohol use and its positive outcomes. *Exp. Clin. Psychopharmacol.* **2**: 269-282, 1994.
- TARTER, R.E. AND VANYUKOV, M. Alcoholism: A developmental disorder. *J. Cons. Clin. Psychol.* **62**: 1096-1107, 1994.
- THOMBS, D.L. AND BECK, K.H. The social context of four adolescent drinking patterns. *Hlth Educ. Res.* **9**: 13-22, 1994.
- THOMBS, D.L., BECK, K.H. AND PLEACE, D.J. The relationship of social context and expectancy factors to alcohol use intensity among 18 to 22 year-olds. *Addict. Res.* **1**: 59-68, 1993.
- THOMBS, D.L., WOLCOTT, B.J. AND FARKASH, L.G.E. Social context, perceived norms and drinking behavior in young people. *J. Subst. Abuse* **9**: 257-267, 1997.
- VALLIANT, P.M. AND SCANLAN, P. Personality, living arrangements, and alcohol use by first year university students. *Social Behav. Pers.* **24**: 151-156, 1996.
- WALITZER, K.S. AND SHER, K.J. A prospective study of self-esteem and alcohol use disorders in early adulthood: Evidence for gender differences. *Alcsm Clin. Exp. Res.* **20**: 1118-1124, 1996.
- WECHSLER, H., DOWDALL, G.W., DAVENPORT, A. AND CASTILLO, S. Correlates of college student binge drinking. *Amer. J. Publ. Hlth* **85**: 921-926, 1995.
- WECHSLER, H., MOLNAR, B.E., DAVENPORT, A.E. AND BAER, J.S. College alcohol use: A full or empty glass? *J. Amer. Coll. Hlth* **47**: 247-252, 1999.
- WECHSLER, H. AND ROHMAN, M. Extensive users of alcohol among college students. *J. Stud. Alcohol* **42**: 150-155, 1981.
- WEISS, L.H. AND SCHWARZ, J.C. The relationship between parenting types and older adolescents' personality, academic achievement, adjustment, and substance use. *Child Devel.* **67**: 2101-2114, 1996.
- WERNER, M.J., WALKER, L.S. AND GREENE, J.W. Relation of alcohol expectancies to changes in problem drinking among college students. *Arch. Pediat. Adolesc. Med.* **149**: 733-739, 1995.
- WIGGINS, B. AND WIGGINS, J.A. Specification of the association between sociability and drinking level among college students. *J. Stud. Alcohol* **53**: 137-141, 1992.
- WOOD, M.D., NAGOSHI, C.T. AND DENNIS, D.A. Alcohol norms and expectations as predictors of alcohol use and problems in a college student sample. *Amer. J. Drug Alcohol Abuse* **18**: 461-476, 1992.
- WOOD, M.D., SHER, K.J. AND STRATHMAN, A. Alcohol outcome expectancies and alcohol use and problems. *J. Stud. Alcohol* **57**: 283-288, 1996.
- WOOD, M.D., VINSON, D.C. AND SHER, K.J. Alcohol use and misuse. In: BAUM, A., REVENSON, T. AND SINGER, J. (Eds.) *Handbook of Health Psychology*, Mahwah, NJ: Lawrence Erlbaum, 2001, pp. 281-318.
- ZUCKER, R.A. The four alcoholisms: A developmental account of the etiologic process. In: RIVERS, P.C. (Ed.) *Alcohol and Addictive Behaviors* (Nebraska Symposium on Motivation, 1986, Vol. 34), Lincoln, NE: Univ. of Nebraska Press, 1987, pp. 27-83.
- ZUCKER, R.A. Pathways to alcohol problems and alcoholism: A developmental account of the evidence for multiple alcoholisms and for contextual contributions to risk. In: ZUCKER, R., BOYD, G. AND HOWARD, J. (Eds.) *The Development of Alcohol Problems: Exploring the Biopsychosocial Matrix of Risk*. NIAAA Research Monograph No. 26, NIH Publication No. 94-3495, Rockville, MD: Department of Health and Human Services, 1994, pp. 255-289.
- ZUCKER, R.A., FITZGERALD, H.E. AND MOSES, H.D. Emergence of alcohol problems and the several alcoholisms: A developmental perspective on etiologic theory and life course trajectory. In: CICHETTI, D. AND COHEN, D.J. (Eds.) *Developmental Psychopathology, Vol. 2: Risk, Disorder, and Adaptation*, New York: John Wiley & Sons, 1995, pp. 677-711.