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# College Students and Problematic Drinking: A Review of the Literature

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## Abstract

Problem drinking during the college years is a significant public health concern. The goal of the current review was to examine the primary psychosocial factors that predict problem drinking in college students. Variables examined included demographic variables, personality, drinking history, alcohol expectancies, drinking motives, stress and coping, activity involvement, and peer and family influence. Evidence from studies of college drinking indicated that the variables associated with college drinking seem to vary at levels dealing with one's personality and coping mechanisms, one's thought processes about drinking, and the environment. It seems that expectancies and drinking motives may serve as explanations for the pathways from certain personality types (i.e., sensation seeking and neurotic) to problem drinking in the college setting. Factors that predicted future drinking problems after college were also examined. Overall, it seems that interventions and prevention programs would need to reach college students at all three levels—the environment, individual personality traits, and cognitive processes. Future research should address the limitations in the previous research as well as test comprehensive models of college drinking.

**Keywords:** college students, alcohol, problem drinking, risk behavior

## 1. Introduction

This review addresses problematic drinking and the variables associated with problem drinking for college students in the United States. As problematic drinking among college

students is an important public health concern with a variety of negative consequences, it is important to understand the variables that may be risk factors for this phenomenon. Further, college students represent a group of individuals who have unique drinking patterns and different risk factors and concerns related to problematic drinking than the population in general. The paper begins by reviewing prevalence of problematic drinking in college students, problems associated with college drinking, and definitions of problematic college drinking. Due to the high variability in drinking among college students, the primary goal of the current paper was to examine psychosocial variables that predict problem drinking and account for variation among college student drinkers. Although there have been a number of other factors associated with problem drinking, such as genetic influences often examined in alcohol-related research, this is not in the scope of the current review and also not necessarily an important influence specifically for college drinking (e.g., see Baer, 2002). Therefore, the current review will cover a subset of factors by focusing on only the primary psychosocial variables linked to college drinking in the literature, beginning with internal influences, leading up to those perceived as external influences. These influences include demographic variables, personality, drinking history, alcohol expectancies, drinking motives, stress and coping, activity involvement, and peer and family influence. Although the current review does not examine interventions for college drinking, understanding such variables and possible models of college drinking can aid in informing prevention and intervention for problem drinking college students. Finally, the review also includes a section examining the research on predicting alcohol problems in the postcollege years.

### ***1.1. Prevalence of alcohol use in college students***

Heavy and/or problematic alcohol use among college students represents a major public health concern. Although problematic alcohol use occurs across many age groups, young adults aged 18–24 years show the highest rates of alcohol use and have the greatest percentage of problems drinkers (Kandel & Logan, 1984; U.S. Department of Health and Human Services, 1997). Although trend data from large-scale studies indicate that there has been a slight improvement in heavy drinking (i.e., drinking large quantities of alcohol in one sitting) among college students (O'Malley & Johnston, 2002; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998), the problem still warrants serious concern. According to the Monitoring the Future project, most students have consumed alcohol within the last year (over 80% throughout the 1990s) (Johnston, O'Malley, & Bachman, 2000). As many as 84.2% of college students reported a heavy drinking or "binge drinking" episode (5+ standard drinks for men and 4+ for women in one sitting) within the previous 90 days (Vik, Carrello, Tate, & Field, 2000) and 44% reported binge drinking in the previous 2 weeks (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler, Lee, Kuo, & Lee, 2000). Most national studies provide a slightly lower but still alarming estimate, indicating that ~2 in 5 students are binge drinkers (e.g., O'Malley & Johnston, 2002; Wechsler et al., 1998). Further, 31% of college men consume > 21 drinks per week and 19% of college women consume >14 drinks per week, exceeding the established standards for safe levels of drinking (U.S. Department of Health and Human Services, 1990).

The Harvard School of Public Health College Alcohol Study found that the median number of drinks consumed by a random sample of students from 140 4-year colleges across the United States was ~1.5 drinks per week with a mean of 5 drinks per week (Wechsler, Molnar, Davenport, & Baer, 1999). Although this result seems to imply little problematic drinking in college students, the problem in binge drinkers becomes apparent when examining the median of 14.5 drinks per week for frequent binge drinkers within this sample. Overall, binge drinkers in this sample represented 44% of the college population, but the binge drinkers accounted for 91% of the alcohol consumed by college students. Thus, binge drinkers are consuming large quantities of alcohol that may not be identified when using mean scores in college drinking research. This estimate may even be low when one considers that this particular survey only allowed for up to 9 drinks per sitting in the self-report questionnaires. According to Clements (1999), 13.1% of the 306 undergraduate psychology students sampled met the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) (American Psychiatric Association, 1994) criteria for alcohol abuse and 11.4% for alcohol dependence within the last 12 months.

Further, it appears that minimum drinking age laws have failed to reduce the availability of alcohol to underage drinkers or reduce drinking rates among 18–20-year-old students. Approximately one in two underage students (i.e., students under the legal drinking age of 21 years old) reported that alcohol was “very easy” to obtain (Wechsler, Lee, Nelson, & Kuo, 2002). Further, odds of binge drinking when under age 21 were slightly higher than being over the legal drinking age (Wechsler, Dowdall, Davenport, & Castillo, 1995).

### *1.2. Defining problem drinking in college students*

One difficulty with examining college problem drinking is the lack of a standard operational definition of “problem drinking” (e.g., Clements, 1999), making it difficult to directly compare studies. Before beginning the review of risk factors related to college student drinking, problem drinking must be defined more clearly. Definitions in the literature generally fit into one of the following two categories (Baer, 2002): (1) Drinking rates or levels or (2) Negative alcohol-related consequences experienced. These terms are reviewed here to clarify terms often used in studies of problematic drinking.

#### *1.2.1. Drinking rates or levels*

Much of the research in college student drinking has employed self-report questionnaires inquiring about drinking quantity or frequency. This research may simply examine overall quantity (i.e., number of standard drinks) or frequency (i.e., days drank alcohol), but these often employ the terms “binge drinking” or “heavy episodic drinking.” Generally, binge drinking is currently defined as the consumption of at least 5 consecutive standard drinks in one sitting for men and 4 consecutive standard drinks in one sitting for women (Wechsler, Dowdall, Davenport, & Rimm, 1995). A standard drink is usually defined as a 12-oz beer, a 4-oz glass of wine, a 12-oz wine cooler, or a 1.25-oz shot of liquor either straight or in a mixed drink (Wechsler et al., 2000). Wechsler et al. (2000) have measured binge drinking as the 4 or 5 standard drinks in one sitting within the previous 2 weeks, although other studies have expanded this to greater periods of time (Vik et al., 2000), asked about

the “typical” day or week of drinking, or asked students to monitor their drinking for a specific period of time.

In addition, frequency of binge drinking is often examined. For instance, Wechsler et al. (2000) defined “frequent binge drinkers” as those who had binged  $\geq 3$  times in the past 2 weeks (or more than once per week on average), “occasional binge drinkers” as those who had binged 1 or 2 times in the previous 2 weeks, “nonbinge drinkers” as those who had consumed alcohol in the past year but had not binged in the past 2 weeks, and “abstainers” as those who had consumed no alcohol in the past year. O’Hare (1997) defined heavy drinking as consuming 6 or more drinks weekly according to the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, De la Fuente, & Grant, 1993). On reviewing the literature, it seems that frequency of binge drinking is potentially an important component of “problem drinking” in college students.

### *1.2.2. Alcohol-related negative consequences*

Many have asserted that quantity and frequency measures of alcohol use are not sufficient to determine the problem status of college student drinkers. For instance, some heavy drinkers may report low levels of alcohol-related problems, while some light or moderate drinkers may experience high levels of alcohol-related problems (White & Labouvie, 1989). As much of the concern with college student drinking deals with the negative alcohol-related consequences, this seems to be the most relevant definition. However, frequent binge drinkers have been found to be more likely to experience alcohol-related problems than other types of students (Wechsler et al., 2000), indicating that frequency of binge drinking may also be an important distinction. Thus, indices of drinking frequency and quantity should serve as an assessment of problematic drinking in addition to alcohol-related negative consequences.

Although diagnostic criteria have been used rarely in the past in college student alcohol research, Clements (1999) asserts that research in the area of problem drinking would be enhanced if more standardized definitions and measures were used, such as the diagnostic criteria for alcohol use disorders established by the DSM-IV. Such diagnoses may also be considered a negative consequence of drinking. However, use of diagnostic criteria should be used with caution in college populations, as alcohol dependence criteria may not be appropriate to the special circumstances of adolescents and college-aged individuals (e.g., MacFarland, 1983). DSM-IV diagnostic criteria involve many of the negative consequences that are used in research investigating alcohol-related problems in college students (e.g., substance-related legal problems, alcohol use in situations in which it is physically hazardous such as while driving, and alcohol-related absences from work or school) (American Psychiatric Association, 1994). In fact, one assessment of alcohol-related problems, the Rutgers Alcohol Problems Inventory (RAPI) (White & Labouvie, 1989), includes nearly all DSM-III-R (American Psychiatric Association, 1987) criteria for an alcohol-related diagnosis.

More recently, other measures similar to the RAPI have been developed to assess alcohol-related problems in college students such as the College Alcohol Problems Scale (CAPS) (O’Hare, 1997) and the Young Adult Alcohol Problems Screening Test (YAAPST) (Hurlbut & Sher, 1992). Although there have not been many studies providing cutoff scores for problem drinking in college students, a cutoff of six problems on the YAAPST demonstrated

the optimal combination of specificity and sensitivity (Hurlbut & Sher, 1992). Thombs and Beck (1994) provided definitions of four categories of drinkers based on a combination of alcohol-related problems and quantity/frequency measures. The most severe group ("high-consequence drinkers") was defined by cutoff score of > 15 on the RAPI. The other three groups ("light drinkers," "moderate drinkers," and "heavy drinkers") were defined by a score of > 15 on the RAPI and different levels of drinking frequency and quantity (see Thombs & Beck, 1994, for detailed description). Similarly, Baer, Kivlahan, Blume, McKnight, and Marlatt (2001) defined high-risk drinking as a combination of drinking quantity and frequency (5–6 drinks at least once in the past month) and negative consequences (at least three negative consequences 3–5 times in the previous 3 years based on the RAPI).

The current paper defines problematic alcohol use as heavy alcohol use (i.e., binge drinking) and/or high levels of alcohol-related negative consequences in examining the related psychosocial factors in college students. Optimally, problem drinking should take into consideration both alcohol use quantity and frequency as well as alcohol-related negative consequences.

### ***1.3. The problems associated with college drinking***

The pattern of young adult drinking is unique because it seems to be relatively variable and have a transitory course with only a subset of students exhibiting heavy drinking patterns consistently across time into adulthood (Weingardt et al., 1998). After an initial increase in alcohol consumption, many students show a gradual reduction in alcohol consumption to a more moderate level throughout later years in college and following college. This phenomenon, often called "maturing out" or "developmentally limited alcoholism" (Zucker, 1987), suggests that as young adults gain more life responsibilities (e.g., employment and family obligations), their drinking rates decline (Marlatt, Larimer, Baer, & Quigley, 1993). College student drinkers are also unique in that they differ from individuals of the same age that do not attend college. This is evidenced by the greater drinking rates in 18–22-year-old college students versus the drinking habits of 18–22-year-olds that do not attend college (O'Malley & Johnston, 2002; Schulenberg, Bachman, O'Malley, & Johnston, 1994). Although those who do not attend college have greater drinking levels during high school years than future college attendees on average, those who attend college still have greater levels of alcohol consumption during the 18–22 age range (O'Malley & Johnston, 2002). Although many college students appear to transition into healthier drinking patterns after college, some do not (e.g., Marlatt et al., 1993; Weingardt et al., 1998). Moreover, heavy drinking puts these students at risk for experiencing significant negative alcohol-related consequences during their college years. Greater frequency of binge drinking has been associated with greater alcohol-related problems (Wechsler et al., 1998, 1999, 2000). Furthermore, findings indicated that alcohol-related problems progress along a continuum (Vik et al., 2000), beginning with greater rates of the more common, relatively less problematic behaviors (i.e., "careless behaviors" such as missing class or getting injured) to more extreme, less frequent behaviors (i.e., "problems with authorities" such as arrests resulting from drinking). Thus, even heavy drinkers who have not experienced problems or experienced minor problems are not immune to experiencing more frequent and/or severe alcohol-related difficulties in the future.

Alcohol contributes to many deaths in the United States (McGinnis & Foege, 1993), and alcohol-related accidents represent the leading cause of death in young adults aged 17–24 years (National Institute on Alcohol Abuse and Alcoholism, 1984). It is estimated that there were at least 1400 unintentional, alcohol-related fatal injuries among college students aged 18–24 years in 1998 (Hingston, Heeren, Zakocs, Kopstein, & Wechsler, 2001). Further, as many as 500,000 of 4-year college students are unintentionally hurt or injured while under the influence of alcohol annually (Hingston et al., 2001). Since the mid-1990s, there has been greater media attention given to alcohol-related deaths among college students, including deaths by acute alcohol poisoning, falls, drownings, automobile collisions, fires, and hypothermia resulting from exposure (Wechsler et al., 2000). However, there is a multitude of other, less severe negative consequences more commonly experienced by binge drinkers that may be neglected by the media. For instance, Wechsler et al. (1994) found that frequent binge drinkers were 25 times more likely than nonbinge drinkers to have experienced five or more alcohol-related consequences such as a hangover, doing something they regretted, missing class, falling behind in school work, forgetting where they were or what they did, arguing with friends, engaging in unplanned and/or unprotected sexual activity, getting hurt or injured, damaging property, getting in trouble with law enforcement, or requiring medical treatment for an alcohol overdose. Heavy drinking also lowers immunity and decreases physical health. Evidence suggests that heavy alcohol consumption in college students contributes to lowered resistance to common illnesses (e.g., upper respiratory infections) that is not associated with light-to-moderate drinking (Engs & Aldo-Benson, 1995). Heavy drinking also increases probability of sexual victimization. Alcohol use increased the risk of being victim to sexual assault as well as the severity of the sexual assault in a sample of college women (Testa & Parks, 1996; Ullman, Karabatsos, & Koss, 1999).

Unfortunately, binge drinkers are not the only students who are affected by their behavior. Heavy drinking endangers not only the individual consuming the alcohol but also other college students and the community in general. Abstinent and/or nonbinge drinking students are being dramatically affected by binge drinking friends, roommates, and peers. According to Wechsler (1996), on campuses where more than half of the students participate in binge drinking, 87% of students that live on campus have experienced some “secondhand effects” of binge drinking. This trend is also true, but at a lesser extent, at schools where less than one third of students participate in binge drinking (Wechsler, 1996). Some of the most common secondhand effects of binge drinking include being insulted or humiliated, experiencing unwanted sexual advances, having interrupted sleep, and babysitting friends or roommates. It is clear that the secondhand effects of binge drinking are widespread and have an impact on most college students (Wechsler, 1996).

Further, the consequences of binge drinkers for others may be quite devastating. For instance, there is increase in physical assault, sexual assault, or damaging property committed by students when intoxicated (Wechsler et al., 1994). Over 600,000 college students are hit or assaulted by drinking college students each year (Hingston et al., 2001). Driving while under the influence of alcohol poses another threat to others. Approximately 32% of college drinkers report driving under the influence of alcohol (Wechsler et al., 1994), putting themselves and others at risk for injury and possibly death. According to Hingston

et al. (2001), in addition to the 2 million college students in the United States that drove under the influence of alcohol in 1999, over 3 million rode as a passenger with a drinking driver. These high-risk behaviors associated with binge drinking put many individuals in danger of fatal injury and death.

## **2. Psychosocial factors associated with problematic drinking in college students**

### ***2.1. Demographic factors***

Demographic factors, particularly gender, have been frequently cited as variables associated with problematic drinking in college students, perhaps due to the number of large epidemiological studies on college drinking that have such demographic factors as gender and ethnicity easily accessible.

#### ***2.1.1. Gender***

The heaviest, most frequent, and most problematic drinking in college has been documented among men. Overall, male students tend to drink alcohol more frequently and in larger quantities than female students (Clements, 1999; O'Malley & Johnston, 2002; Read, Wood, Davidoff, McLacken, & Campbell, 2002; Valliant & Scanlan, 1996). Additionally, male students are more likely to engage in binge drinking (Wechsler et al., 1994; Wechsler, Dowdall, Davenport, & Castillo, 1995; Wechsler, Dowdall, Davenport, & Rimm, 1995) and/or risky drinking (Hill & Chow, 2002) and to meet criteria for an alcohol use disorder (Clements, 1999; Hill & Chow, 2002) than female students. According to McCabe (2002), men and women seem to have different trends in heavy episodic drinking during their matriculation. For male undergraduate students, sophomores, juniors, and seniors tended to engage in more heavy and frequent heavy episodic drinking than freshmen male undergraduates. On the other hand, upper-class women tended to drink less than freshmen undergraduates. College men also are more likely to experience higher levels of alcohol-related consequences than college women (Read et al., 2002) as measured by items from the YAAPST. Gender socialization may play a large role in these differences. Women may have been socialized to internalize distress, while men have been socialized to externalize distress, leading to increased drinking behavior in men (Cooper, Russell, Skinner, Frone, & Mudar, 1992). The relationship of stress and negative affect to drinking is discussed in later sections.

Overall, it appears that male drinking college students have more alcohol-related negative consequences than females, but this may not be true when damage to self and more private consequences (i.e., poor academic performance, unintended sexual activity, memory loss, hangovers, nausea, blackouts, and injury to self) is considered (Perkins, 2002). According to Perkins (2002), male college students tended to have more consequences for self and others that involve public deviance, while female college students tended to have consequences that are personal and relatively private. When considering both types of negative consequences, there were no gender differences. Thus, the definition of "negative consequences" may be important in examining college student behavior, as the negative consequences typically measured are those that are experienced more often by men. This is a limitation of the studies in which gender differences were found.

Furthermore, gender differences in amount of alcohol consumed may not translate directly into levels of intoxication and alcohol-related problems due to previously mentioned differences in alcohol absorption into the bloodstream. Women can typically reach the same blood alcohol concentration as men while drinking less alcohol due to biological differences in body weight, fat-to-water ratios, and metabolic processing (e.g., Perkins, 2002). Therefore, it may be important to examine college problematic drinking in terms of blood alcohol concentration levels. There appears to be a lack of studies considering blood alcohol levels when examining college drinking, and this may limit the interpretability of gender differences found in previous literature.

Although there has been a history of research consistently finding gender differences in drinking patterns, some researchers have speculated that women are becoming more like men in their drinking patterns (Goodwin, 1989; Maney, 1990). This is concerning when one considers the biological differences in alcohol absorption. There is evidence indicating that women living in coed environments may adopt drinking patterns similar to that of the men in their living unit (Martin & Hoffman, 1993), with no differences in alcohol use across gender. Further, the prevalence of frequent binge drinking in women has increased even more in all-women's colleges (Keeling, 2002) than in coed or all-men's colleges. College women may be approaching male college students' level of alcohol use and alcohol-related problems as gender drinking norms change with other evolving gender norms. These findings illustrate the importance of other sociocultural factors in relation to gender's association with drinking behavior. In addition, the gender differences in drinking and alcohol-related problems commonly seen in previous research may not be as great as once thought when one considers the limitations of research involving drinking and gender as well as the current trends.

### 2.1.2. *Ethnicity*

Anglo-American students seem to have the highest risk for problematic drinking, particularly among men (Wechsler, Dowdall, Davenport, & Castillo, 1995; Wechsler, Dowdall, Davenport, & Rimm, 1995). O'Malley and Johnston (2002) examined alcohol use across five national sources of data and found that Anglo-American students were highest in heavy drinking. Further, there were consistent trends in which African American students had the lowest rates of heavy drinking, with Hispanic American students having rates in between Anglo-American and African American students. According to O'Malley and Johnston (2002), these trends in ethnic differences in drinking have been relatively stable since 1980. Another study including individuals who identified themselves as Native American or Asian American in addition to the other ethnic groups found a similar trend (Presley, Meilman, & Cashin, 1996). However, Native American students endorsed the highest rates of consequences as did Anglo-American students, with Asian American and African American students having the lowest rates of negative consequences. Again, Hispanic American college students had an intermediate rate of negative consequences. Further research using large national data samples is necessary to make conclusions regarding the relationship between problem drinking and students who identify themselves as Native American or Asian American. Overall, it seems that the "white male" student has the greatest risk for problem drinking. Higher levels of problem drinking in Anglo-American men

are likely related to the greater involvement in fraternities and other social groups that encourage drinking.

Overall, it seems that there have been some relationships established regarding gender and ethnicity, in that Anglo-American male students have been consistently found to have the greatest problem drinking. However, due to problems with measurement as well as environmental influences that may not be considered in these studies, other influences on drinking behavior must be investigated.

## **2.2. Personality factors**

Personality factors have been used to try to explain a variety of human behaviors, including risky behaviors (e.g., Vollrath & Torgersen, 2002). Research on personality and problematic alcohol use in college students has tended to focus on two general personality dimensions found to be associated problematic drinking: traits labeled as sensation seeking, impulsivity, or novelty seeking and traits labeled as neuroticism, emotionality, or negative affect.

### *2.2.1. Sensation seeking*

The literature has demonstrated that high levels of sensation seeking are related to higher levels of aspects of problem drinking, while low levels are generally associated with non-problem drinking or abstinence. Students who tend to engage in risky and/or problem behaviors in general are more likely to engage in binge drinking (McCabe, 2002), indicating the possibility of a common sensation seeking tendency across behaviors. The relationship between a personality style of sensation seeking and greater problematic drinking has been consistently replicated, particularly for men (e.g., see reviews by Baer, 2002; Brennan, Wal-fish, & AuBuchon, 1986a). Students who engaged in high-risk drinking and high-risk driving behaviors while drinking were higher sensation seekers than those who did not engage in these high-risk behaviors (Beck, Thombs, Mahoney, & Fingar, 1995). Impulsivity and venturesomeness were positive correlated with alcohol use quantity and frequency but not with alcohol-related problems (Camatta & Nagoshi, 1995). One limitation of many studies of sensation-seeking traits is that many measures of sensation seeking include items that explicitly ask about alcohol use. The primary measure used in recent sensation seeking research (Arnett, 1994), the Sensation Seeking Scales (SSS) (Zuckerman, 1979), includes a disinhibition subscale that includes such alcohol use items (Darkes, Greenbaum, & Goldman, 1998). According to Darkes et al. (1998), there seems to be criterion contamination that may be influencing the results examining drinking and sensation seeking. Watten (1996) reported that Norwegian undergraduates who were abstainers from alcohol had significantly lower levels of sensation seeking. Although there are issues pertaining to the generalizability of results to students in the United States, the results are important in that the researchers used the Arnett Inventory of Sensation Seeking (AISS) (Arnett, 1994), a measure that excludes items explicitly asking about alcohol use. According to Valliant and Scanlan (1996), students at risk for alcohol addiction had significantly greater scores on the Mania (Ma) and Psychopathic deviate (Pd) scales of the Minnesota Multiphasic Personality Inventory (MMPI) (Meehl & Hathaway, 1946) than did students who were not at risk for alcohol addiction. This personality profile is consistent with tendencies to be impulsive,

nonconformist, and sensation seeking. Again, there could be some criterion contamination in that the MMPI contains a few items directly related to substance use.

There is some evidence supporting the notion that the sensation seeking personality style is more relevant to problematic drinking in male college students than female students. For instance, impulsivity was significantly correlated with alcohol use problems for males but not for female college students (Wood, Nagoshi, & Dennis, 1992). It seems that the Anglo-American male with sensation seeking traits may be at an even greater risk for problematic drinking in college, as a comprehensive review of college student drinking indicated that a sensation seeking lifestyle is the strongest predictor of drinking for the "white male" but not for other demographic subgroups (Brennan et al., 1986a). However, due to limitations previously mentioned regarding the assessment of gender differences in problem drinking (i.e., measurement of negative consequences and alcohol absorption), further research must be conducted to determine if sensation seeking is more relevant to college drinking men than women.

**Social bond theory.** Social bond theory is a sociological theory that has been used to explain deviant behavior (Hirschi, 1969), particularly college student binge drinking. According to Hirschi (1969), the four elements of the social bond are attachment to significant others, commitment to conventional activities (e.g., academics and religion), involvement in conventional activities, and belief in conventional wisdom (e.g., respect for authority and acceptance of society's rules). The theory posits that one displays deviant behavior when their connection between the individual and society, or the "social bond," is weak or lacking (Shoemaker, 1996). Thus, those with a nonconforming, low conscientiousness personality style may have a weak social bond. Some research has supported this theory. According to Rohsenow (1982), nonconformist tendencies over time predicted higher drinking rates in a sample of male students. Likewise, in a sample of university students in Switzerland, those with lower levels of conscientiousness and neuroticism, as well as higher levels of extraversion, were found to report more alcohol consumption, drunkenness, and drunk driving (Vollrath & Torgersen, 2002). These studies provide support for the notion that those who tend to lack conformity and conscientiousness have a weak social bond that may lead to problem drinking behavior. In addition, abstainers from alcohol tended to present with conforming and conscientious personality profile (Watten, 1996). Although much of this research is limited to self-report and some research may be limited in its generalizability, there is some correlational support for the social bond theory.

### 2.2.2. *Neuroticism*

In a sample of young adults that consisted of mostly college students, Martin and Sher (1994) found that individuals with alcohol use disorder diagnoses in the past 12 months had higher levels of neuroticism and lower levels of agreeableness and conscientiousness as measured by the NEO Five-Factor Inventory (NEO-FFI) (Costa & McCrae, 1989) 3 years earlier. According to Costa and McCrae (1985), this pattern suggests that young adults with alcohol use disorders tend to experience negative affective states such as anxiety, anger, disgust, and sadness and have more difficulty in coping with stress. These results are noteworthy in that the study was longitudinal in nature and provided reliable diagnostic

information. Likewise, Vollrath and Torgersen (2002) reported that students high in neuroticism and extraversion reported drunkenness more often. Those with elevations only in neuroticism had average levels of alcohol consumption but an elevated level of drunk driving. Problem drinkers have reported lower self-esteem and higher social anxiety (constructs related to neuroticism) than nonproblem drinkers (Lewis & O'Neill, 2000). Conversely, there were no relationships among drinking rates and trait anxiety or depression among a sample of 36 male college students and an inverse relationship between drinking rates and social anxiety (Rohsenow, 1982). However, due to the small sample size, this study may not accurately reflect the relations of social anxiety to drinking. The mixed results could also be related to differences in gender and ethnicity. According to Brennan et al. (1986a), four studies found that relations existed among variables related to neuroticism (i.e., loneliness, frustration, and depression) with drinking rates and consequences for female college students but not for males. In a second review, Brennan, Walfish, and Aubuchon (1986b) reported that when individuals who do not belong to the "white male" demographic group drink heavily and abusively, it seems to be related to internal pressures, such as anxiety, neuroticism, depression, and low self-esteem.

Shyness, a construct related to social anxiety and behavioral inhibition (Buss, 1980), has been found to have an inverse relationship with drinking level and negative consequences from drinking (Bruch, Rivet, Heimberg, & Levin, 1997). Watten (1996) reported that Norwegian undergraduates who abstained from alcohol were less sociable and had more rigid impulse control, which may also indicate a negative relationship between behavioral inhibition and drinking. Bruch et al. (1997) asserted that this may be because shyness is less severe than manifestations of anxiety such as social anxiety disorder; therefore, there is not as great of a need to reduce the shyness by using alcohol. Similarly, Tran, Haaga, and Chambless (1997) suggested that subclinical anxiety may serve as a protective factor against alcohol abuse and that high social anxiety serves as a risk factor. This explains the higher prevalence of social anxiety disorder and alcohol use disorders than those without the disorder in the general population (e.g., Kushner, Abrams, & Borchardt, 2000) and in college students (Kushner, Sher, & Erickson, 1999) found consistently in the literature. In addition, anxiety disorders seem to demonstrate a reciprocal causal relationship with alcohol use disorders over time for college students. In some cases, anxiety disorders lead to alcohol dependence, while alcohol dependence may lead to anxiety disorders in others (Kushner et al., 1999). In fact, freshmen diagnosed with an anxiety disorder were found to be at least 2 times more likely to have a diagnosis of alcohol dependence at year 4, and this increased to about 3.5 times by year 7 (Kushner et al., 1999). Research has also linked depression to college drinking. Camatta and Nagoshi (1995) found that depression and irrational beliefs predicted alcohol use problems in a college student sample. As with anxiety disorders, there is a greater comorbidity of major depression and alcohol abuse in college students than in individuals without an alcohol use disorder (Deykin, Levy, & Wells, 1987). Onset of depression typically precedes the alcohol use disorder (Deykin et al., 1987), providing support for the notion that depression serves as a vulnerability for alcohol abuse in college students.

Drinking and negative affect states may have unique characteristics regarding context and drinking patterns. For example, in a laboratory setting, college students who reported

high trait social anxiety drank more alcohol when in anticipation of delivering a self-disclosing speech than in a baseline condition (Kidorf & Lang, 1999). Elevated anxiety sensitivity (i.e., fear of anxiety-related sensations, such as a rapid heartbeat) has been associated with increased drinking behavior in college students (Stewart, Peterson, & Pihl, 1995; Stewart, Zvolensky, & Eifert, 2001). However, individuals with high levels of anxiety sensitivity may drink more frequently, but less per occasion, than low or moderate anxiety sensitive students (Stewart et al., 2001). Thus, it seems that there is a subgroup of individuals at risk for problematic drinking that differs significantly from the more commonly identified sensation-seeking type. These individuals may use alcohol as a method of coping with specific negative affect states that commonly occur with their personality style.

In conclusion, it seems that students with sensation-seeking personality traits have a relatively well-established relationship with problem drinking, particularly for male students. However, there have been problems with criterion contamination because of the measures used to assess sensation seeking. Related research has supported the connection of nonconformist tendencies and lack of conscientiousness and drinking behavior that may circumvent the problems of criterion contamination. Neuroticism has a less clear relationship with drinking behavior, as there have been findings of both positive and negative relationships with drinking behavior. The neuroticism/drinking relationship in students may be better explained by influence of additional variables to be discussed. Personality style also has important relations with other variables related to drinking. In particular, a sensation-seeking style seems to relate to one's drinking before college.

### *2.3. Drinking history*

One's drinking history, or alcohol use before college, has often been addressed in college drinking literature. According to Hildebrand, Johnson, and Bogle (2001), drinking patterns seemed to develop primarily in high school level or earlier and did not change considerably in the transition from high school to college. Senior year substance abuse has been found to predict post-high school substance use (Schulenberg et al., 1994). Similarly, high school binge drinking has been found to be an important predictor of college binge drinking behavior (Wechsler, Dowdall, Davenport, & Castillo, 1995; Wechsler, Dowdall, Davenport, & Rimm, 1995), and precollege alcohol use was a significant predictor for more frequent binge drinking (McCabe, 2002). Heavy episodic drinking in high school was related to higher probabilities of all alcohol-related problems and drinking and driving (Harford, Wechsler, & Muthen, 2002). Importance of drinking in high school was found to be a significant predictor for weekly drinking in college (Reis & Riley, 2000), providing support for the notion that one's precollege attitudes about drinking are important in college drinking.

Age of onset of drinking may be an important factor in problematic college drinking. For instance, among university athletes, higher levels of alcohol involvement were found among those with an earlier onset of drinking (Thombs, 2000). Another study reported that an earlier age of onset was related to greater drinking rates and alcohol-related problems (Gonzalez, 1989). This pattern was particularly strong when drinking began in elementary school or middle school versus high school or college onset of drinking. According to Baer (2002), early initiation of alcohol consumption may imply behavioral tendencies associated with nonconformity and sensation seeking. Together, these findings regarding drinking

age of onset and greater drinking before college provide further support for the notions that many drinking norms and attitudes are formed before college.

#### *2.4. Alcohol expectancies*

Previously, the tension reduction hypothesis of alcohol use was a predominant, generalized explanation for drinking behavior (Young, Oei, & Knight, 1990). This hypothesis stated that one drinks to reduce tension and desires to continue to drink via the negative reinforcement properties of alcohol. However, this hypothesis was not supported in the research, and it has developed into various expectancies that explain individual drinking behavior (Young et al., 1990). This includes the tension reduction expectancy as well as several others, which together provide a more accurate portrayal of individual drinking behavior. "Alcohol expectancies" (Brown, Goldman, Inn, & Anderson, 1980) refer to the beliefs that people hold about the effects of consuming alcohol. According to expectancy theory, high positive outcome expectancies (expectations of positive reinforcement from consuming alcohol) regarding alcohol usage combined with low expectancies about negative effects (negative consequences that produce feelings of reservation or behavioral inhibition, such as cognitive/physical impairment or depressant effects) of alcohol will lead to excessive consumption (Burke & Stephens, 1999).

Several studies have supported the relations between certain expectancies and problematic drinking behavior (Brown, 1985; Martin & Hoffman, 1993; Reis & Riley, 2000; Wood et al., 1992), including the ability for positive alcohol expectancies to predict future drinking in nondrinking adolescents (Smith, Goldman, Greenbaum, & Christiansen, 1995). According to Brown (1985), a composite variable of expectancies and background variables (i.e., gender, class level, ethnicity, marital status, socioeconomic status, religious affiliation and frequency of attendance, number of generations raised in the United States, and family history of alcohol problems) predicted heavy, frequent drinking. Further, alcohol expectancies were better predictors of problem drinking than background variables alone or a background expectancy composite variable. Research suggests that problem drinkers have positive expectancies about the immediate effects of alcohol use rather than the long-term negative consequences (e.g., impaired social functioning) (Lewis & O'Neill, 2000).

The following expectancies will be reviewed: global positive change, arousal, sexual enhancement, cognitive and/or motor functioning, social assertion, tension reduction, social and/or physical pleasure, and depression.

##### *2.4.1. Global positive change*

Global positive change expectancies consist of beliefs related to creating an overall positive feeling from alcohol. According to Baer's (2002) review, the most consistent relationships in the literature among expectancies and problematic drinking have been with global positive expectancies. Turrisi, Wiersma, and Hughes (2000) conducted a study examining expectancies, binge drinking, and negative consequences experienced from binge drinking in college freshmen. In this sample of freshmen, those who held greater beliefs that alcohol can make positive transformations had a greater likelihood of experiencing many negative consequences when binge drinking (i.e., blackouts, regretting a sexual situation, experi-

encing hangover symptoms, and driving after drinking too much), regardless of the magnitude of binge drinking. Lewis and O'Neill (2000) found that problem drinkers have greater global positive change expectancies than nonproblem drinkers, but this study has limitations in its sample size, cross-sectional design, and homogenous sample. There have been at least two studies that provide more compelling evidence that global positive expectancies are related to future drinking behavior. For example, global positive expectancies were positively correlated with increases in beer consumption over a 2-month period for male but not for female students (Kidorf, Sherman, Johnson, & Bigelow, 1995). In another prospective study, Carey (1995) found that global positive change expectancies predicted maximum daily drinking over 1-month assessment intervals.

#### 2.4.2. *Arousal*

The arousal expectancy encompasses beliefs regarding a heightened state of physiological arousal, aggression, and hostility. According to Wood et al. (1992), the expectancy for hostility (e.g., feel aggressive and get into fights) was predictive of alcohol use frequency and alcohol problems. College student problem drinkers expected more arousal (Lewis & O'Neill, 2000) than nonproblem drinkers. According to Thombs (1993), the expectancy profile that distinguished female problem drinkers from female nonproblem drinkers was that of arousal and power, and this profile did not distinguish male students. Overall, arousal and aggression expectancies have been found to be related to problem drinking, and this relationship may be stronger for female students. These studies on arousal expectancies and problem drinking have limited interpretability due to their designs and often correlational relationships.

#### 2.4.3. *Sexual enhancement*

According to O'Hare and Sherrer (1997), expectancies regarding the enhancement of sexual pleasure predicted socioemotional distress but not community-based alcohol problems for first-time offenders of the university drinking rules. However, another study revealed that problem drinkers had greater sexual enhancement expectancies than nonproblem drinkers (Lewis & O'Neill, 2000). Carey (1995) provided more compelling evidence by investigating 140 undergraduates and reported that sexual enhancement expectancies predicted the frequency of intoxication over a 1-month period. Female undergraduates who had been sexually victimized had higher levels of sexual enhancement expectancies and alcohol consumption than women who had not experienced sexual victimization (Corbin, Bernat, Calhoun, McNair, & Seals, 2001). The mixed results could be because there are particular subsets of the population (i.e., first-time offenders of alcohol policy and women who have experienced sexual victimization) that may have different relationships among drinking and sexual enhancement expectancies. Overall, sexual enhancement expectancies appear to be related to greater problem drinking. There is some evidence of causality, but this needs to be further explored.

#### 2.4.4. *Cognitive/motor functioning*

The expectation of greater physiological impairment (e.g., get dizzy and get headache) from alcohol consumption was a significant predictor for elevated alcohol use and alcohol

problems (Wood et al., 1992). Conversely, Lewis and O'Neill (2000) found that problem drinkers had greater expectancies of improvements in cognitive and motor abilities than nonproblem drinkers. Heavy drinkers may view the behavioral and cognitive effects from alcohol as being a positive change. There are gender differences in these expectancies that may serve as explanations for differences in drinking patterns. For instance, undergraduate women expected significantly more behavioral impairment at a high level of intoxication, whereas male undergraduates did not at this high level of intoxication (Wall, McKee, & Hinson, 2000). These findings highlight the importance of considering dose-specific expectancies regarding behavioral functioning. These may be particularly important across gender, as the same doses have different physiological effects on men and women. Although expectancies regarding cognitive, behavioral, and motor functioning are generally classified as negative expectancies, these expectancies seem to contradict the tenets of expectancy theory as they predict greater drinking. Perhaps heavy drinkers do not perceive this effect as a negative one.

#### 2.4.5. *Social assertion*

Expectancies of social assertion refer to beliefs regarding increased sociability and assertiveness from drinking. The social assertion expectancy has been found to be correlated with alcohol use in college student populations (Martin & Hoffman, 1993). Additionally, alcohol consumption in a college sample was found to predict social assertiveness expectancies (O'Hare, 1990), and college student problem drinkers had greater expectancies for improvements in social behavior than nonproblem drinkers (Lewis & O'Neill, 2000). Tran et al. (1997) found that the expectancy of social anxiety reduction predicted quantity of alcohol consumed per occasion but not frequency of consumption in the past month. Among a sample of college students who were first-time offenders of the campus drinking rules, those with greater expectancies in social assertiveness also reported more acute effects from drinking (e.g., nausea and vomiting), spending too much money on alcohol, driving while under the influence, and problems with the law (O'Hare & Sherrer, 1997). Turrisi et al. (2000) demonstrated that freshmen having greater levels of social behavior enhancement expectancies had a greater likelihood of experiencing many negative consequences from binge drinking (i.e., blackouts, regretting a sexual situation, experiencing hangover symptoms, and getting into a physical fight). On the other hand, Wood et al. (1992) found that college students who expected disinhibition (e.g., feeling talkative and feeling sexually aggressive) predicted level of drinking but not drinking problems. Thus, there are mixed findings as to whether the social assertiveness expectancies are a risk factor for heavy drinking but seem to be a risk factor for alcohol-related problems. However, these studies are limited in their causal interpretability.

It may be that the social assertiveness expectancies predict problematic drinking for specific individuals. For example, students having a belief that even moderate alcohol consumption can increase confidence in social situations or relieve tension were more likely to report psychological problems such as depression, anxiety, negative feelings toward oneself, and relationship problems (O'Hare & Sherrer, 1997). This lends support for a relationship among this expectancy, drinking, and negative and/or anxious affect. Further, male students who expected alcohol to improve social assertiveness drank more alcohol

when in anticipation of giving a self-disclosing speech than when in a baseline condition (Kidorf & Lang, 1999), indicating that this expectancy may be causally related to drinking in response to social stressors for men. In another study, social assertiveness expectancies were found to be positively correlated with increases in beer consumption over a 2-month period for male but not for female college students (Kidorf et al., 1995). These studies give strong evidence that the social assertiveness expectancy is important in drinking problems of those with psychological problems, particularly for male students.

#### 2.4.6. *Tension reduction*

Brown (1985) found that expectancies of relaxation and tension reduction were the strongest predictor of problematic drinking, even more than the expectancy of social and physical pleasure. In addition, alcohol consumption has been associated with tension reduction expectancies (O'Hare, 1990), a general tension reduction expectancy was associated with both quantity and frequency of drinking in the past month (Tran et al., 1997), and problem drinkers had greater tension reduction expectancies than nonproblem drinkers (Lewis & O'Neill, 2000). Tension reduction expectancies have been associated with drinking-related negative consequences. For instance, first-time offenders of campus drinking policy with high tension reduction expectancies were also found to report more acute effects of drinking, spending too much money on alcohol, drinking and driving, and problems with the law (O'Hare & Sherrer, 1997).

As discussed previously, students having greater levels of tension reduction and social assertiveness expectancies were also more likely to have psychological problems related to negative affect and neuroticism (O'Hare & Sherrer, 1997). However, there was a lack of a relationship between tension reduction expectancies and drinking for college students in a social stressor condition of giving a speech (Kidorf & Lang, 1999). This expectancy may be predictive of drinking in specific contexts but not that of a social stressor such as a speech. More research is needed to determine if the tension reduction expectancy has a causal relationship with drinking and determine the direction of that relationship if this relationship does exist.

#### 2.4.7. *Social/physical pleasure*

Research has shown that enhancement of social and physical pleasure (e.g., "drinking makes me feel good" and "drinking adds a certain warmth to social occasions") is an expectancy of some college students who are frequent drinkers. Social and physical pleasure expectancies correlated significantly with alcohol use (Martin & Hoffman, 1993), and alcohol consumption has been found to predict social/physical pleasure expectancies (O'Hare, 1990). According to Brown (1985), expectations of enhanced social and physical pleasure were associated with frequent but nonproblematic drinking. For male students, expectancy of social and physical pleasure was found to distinguish between problem and nonproblem drinkers (Thombs, 1993), with nonproblem drinkers actually reporting higher pleasure expectancies. The social and physical pleasure expectancies appear to be much less related to alcohol-related problems and more related to nonproblematic social drinking, particularly for men. In fact, Brown et al. (1980) observed that less experienced drinkers

tended to hold this expectancy rather than more specific expectancies, such as sexual enhancement or aggression. Thus, social and physical pleasure expectancies are likely held more strongly by individuals who do not have much experience with drinking.

#### 2.4.8. *Depression*

Expectancy of depression (e.g., feeling sad and feeling sleepy) has been found associated with more alcohol problems, but not with alcohol use frequency, in college students (Wood et al., 1992). This suggests that such expectancy may be associated with a more problematic form of drinking. This finding implies that the belief one will experience depressive effects from alcohol was not viewed as negative by problem drinkers. On the other hand, Turrisi et al. (2000) found that greater expectancies of negative affect from drinking alcohol was negatively related to the negative consequence of getting into a fight after drinking and not related to other negative consequences. Due to lack of research of negative expectancies related to depression, it is difficult to draw conclusions. However, it is interesting that Wood et al. (1992) reported such counterintuitive findings, with depression expectancies associated with more drinking problems.

#### 2.4.9. *Valuations of alcohol expectancies*

According to classic expectancy value theory (Bandura, 1977), an outcome expectancy will only increase behavior if the person desires or values the expected outcome. For example, there is evidence that heavier drinkers may view the negative effects of alcohol as more benign than lighter drinkers (Williams & Ricciardelli, 1996); thus, so-called negative expectancies have less of an effect in preventing the drinking behavior of this group. Bandura (1977) asserts that having both high expectancies and high valuations of these expectancies is most likely to result in behavior change (increases in behavior if the expected outcome is valued as highly positive and decreases in behavior if the expected outcome is valued as highly negative). Effects of alcohol that may be perceived as highly desirable by some individuals may be perceived as undesirable for others, such as expectancies regarding aggressiveness in men, talkativeness in women, and one's own lustfulness (Leigh, 1989). This would explain the previously mentioned relationships among depression, behavioral impairment, and problem drinking. Although the experiences of depression and behavioral impairment are generally assumed to be negative consequences of alcohol use, some drinkers may perceive these as positive effects (e.g., men may value behavioral impairment as a sign of masculinity). These apparent contradictions among research regarding negative alcohol expectancies and college drinking may be explained by a failure to assess the desirability or valuation of the expectancies, a criticism of many measures of alcohol expectancies (Fromme, Stroot, & Kaplan, 1993; Leigh, 1989). In response to these criticisms, Fromme et al. (1993) developed the Comprehensive Effects of Alcohol (CEOA) questionnaire, which includes items addressing positive expectancies, negative expectancies, and valuations of various possible consequences of drinking.

There has been little research examining valuations of expected effects. One study using a college student sample found that valuations of "positive" expectancies were related to alcohol use but not to valuations of "negative" expected effects (Fromme et al., 1993). On the other hand, recent work by Fromme and D'Amico (2000) with adolescents indicated

that the subjective valuations of alcohol's effects may be more important for the "negative" expectancies than positive expectancies in predicting alcohol use. In particular, higher positive valuations of cognitive and behavioral impairment were related to greater drinking.

This review has indicated that alcohol expectancies were, for the most part, associated with greater levels of drinking and with drinking problems. However, some alcohol expectancies were related to problematic drinking for specific populations. For instance, high expectancies for arousal were related to greater alcohol consumption for female college students. The social assertiveness expectancy seemed to be important in drinking problems for those with psychological problems, particularly for men. The sexual enhancement and tension reduction expectancies were also related to greater drinking and psychological problems. It may be that social assertiveness, sexual enhancement, and tension reduction expectancies mediate the relationship among psychological problems, such as anxiety or depression, and drinking problems. The social and physical pleasure expectancy seems to be the one least related to problematic drinking and may be related to social drinking in male college students. Surprisingly, there were some studies finding that the two expectancies generally described as negative expectancies (i.e., cognitive and motor impairment and depression) were positively related to greater drinking levels. This finding, together with the finding of greater cognitive and motor impairment being associated with greater drinking, suggests that these effects may not be viewed as negative by heavy drinking college students. Additional research that includes negative expectancies and valuation measures is needed to better understand this relationship.

### *2.5. Drinking motives*

Drinking motives refer to the need or psychological function that drinking fulfills and are generally assessed by self-report responses by students on measures about their reasons for drinking (Baer, 2002). Motivation theory asserted that drinking motives or "reasons for using" are the final common pathway to alcohol use and abuse, through which more distal risk factors (e.g., personality factors) exert their influences (Cooper, 1994). Research has demonstrated that drinking motives were powerful predictors of both heavy drinking and alcohol-related problems among college students (Carey & Correia, 1997; Ratliff & Burkhardt, 1984). Cooper (1994) has proposed a four-factor model of drinking motives that includes two dimensions: source (internal or external reward) and valence (positive or negative reinforcement). The four specific drinking motives were coping (internal  $\times$  negative reinforcement), conformity (external reward  $\times$  negative reinforcement), enhancement (internal rewards  $\times$  positive reinforcement), and social (external rewards  $\times$  positive reinforcement).

#### *2.5.1. Coping motives*

Coping motives involve drinking to avoid (negative reinforcement) the experience of negative affective states (internal), such as depression or anxiety. Coping motives are also referred to as "drinking-to-cope," avoidance, or self-medication motives. Regression analyses indicated that the use of alcohol for self-medication reasons significantly predicted drinking frequency and problems (Wood et al., 1992). This association seems to be particularly important for female college students. For example, drinking for coping reasons was

the single best predictor of drinking levels 2 years after initial administration of questionnaires in female but not in male college students (Schall, Weede, & Maltzman, 1991). According to Stewart and Devine (2000), students who drink to avoid or reduce negative emotions tend to have more depressed mood and may use alcohol as a method to reduce dysphoria. Thus, problematic drinking for women could be a product of depressed symptoms. According to Beck et al. (1995), drinking in the context of emotional pain was more important for women than men, and this was related to alcohol use intensity and impaired driving. Stewart et al. (2001) found that coping motives explained increased drinking in women with high anxiety sensitivity and indicated that these women may be motivated to drink by the desire to avoid unwanted internal states.

Overall, coping motives seem to be related to greater drinking problems and psychological distress. It is possible that the associations between coping motives and greater problem drinking are related to perceptions of one's ability to cope in general. A study examining generalized self-efficacy expectancies for regulating one's negative mood and drinking in college students indicated that coping was the only motive found to predict problem drinking (Kassel, Jackson, & Unrod, 2000). If one has deficiencies in coping skills (or perceives such deficiencies), then the individual may be more likely to use alcohol as a coping device. This vulnerability is likely stronger for women than men.

#### 2.5.2. *Conformity motives*

The desire to attain peer acceptance and social approval or "conformity" drinking has been identified as a major reason for drinking (Farber, Khavari, & Douglas, 1980). Conformity motives involve drinking to avoid (negative reinforcement) the experience of social censure (external). Conformity motives have been associated with drinking in situations where there are strong pressures to conform and with alcohol-related problems in general (Cooper, 1994). For instance, conformity-motivated college drinkers tended to be higher in self-consciousness and seemed to use alcohol to control feelings of social awkwardness (Stewart & Devine, 2000). Another study examining Cooper's (1994) four-factor model found that conformity motives explained elevated drinking in male college students who are high in anxiety sensitivity (Stewart et al., 2001), indicating that these men may be motivated to drink to avoid aversive external consequences such as social embarrassment. Overall, it appears that students who drink for conformity motives and drink heavily have greater self-consciousness, have greater anxiety, and are more likely to be men.

#### 2.5.3. *Enhancement motives*

Enhancement motives involve drinking to increase (positive reinforcement) positive affect (internal). Overall, the enhancement of internal affective states has been found to predict alcohol-related problems (Cronin, 1997). Both sensation seeking and enjoyment motives seem to fall within the category of enhancement motives.

**2.5.3.1. Sensation seeking.** Stewart and Devine (2000) suggest that young adults who drink to enhance positive affect tend to be excitement seekers who use alcohol to fulfill needs for novelty and stimulation. Drinking for the "thrill" or sensation seeking has been associated

with increased reports of alcohol-related problems, even more so than avoidance motivations (McCarty & Kaye, 1983). The disinhibition subscale (i.e., lack of behavioral control) of sensation seeking was found to be the best predictor of drinking levels 2 years after initial administration of questionnaires for male college students (Schall et al., 1991). For female students, however, sensation seeking subscales of thrill seeking and boredom susceptibility were significant predictors of drinking levels after the coping reasons previously mentioned. Sensation seeking motives have been associated with greater expectations of positive consequences for heavy drinking, lower expectations regarding negative consequences of heavy drinking, and self-reported heavy drinking at a 6-month follow-up (Katz, Fromme, & D'Amico, 2000).

**2.5.3.2. Enjoyment.** According to McCarty and Kaye (1983), students who rated all motives for drinking as important, but rated enjoyment motives the highest drank more, reported many alcohol-related problems and did not drink responsibly. However, those who only rated enjoyment reasons as important motives for drinking reported little drinking and few alcohol-related problems. "Drinking to get drunk," an enjoyment expectancy, was a much stronger predictor of frequent binge drinking than less frequent binge drinking (McCabe, 2002) and was associated with increased frequency of intoxication (Wechsler & Rohman, 1981). There is a lack of research on this motive, particularly any longitudinal studies or studies other than self-report. However, this motive seems to be a facet of affect enhancement and related to sensation seeking.

#### *2.5.4. Social motives*

Social affiliative motives involve drinking to achieve (positive reinforcement) affiliation (external). According to Stewart and Devine (2000), socially motivated drinkers tend to be outgoing individuals who used alcohol to fulfill affiliative needs. Social motives may increase the likelihood of consuming alcohol but do not seem to increase the risk of problems resulting from drinking. For example, Cronin (1997) found that social camaraderie motives entered first in regression models predicting drinking rates but not alcohol-related problems. Similarly, Kassel et al. (2000) reported that social motives were not a significant predictor of drinking problems. This motive may be relevant to those individuals who tend to socialize more and are exposed to more social situations where alcohol is present. In other words, those who drink for such motives drink more frequently due to a desire to socialize in drinking situations but may not drink large quantities per occasion. Social motives may tend to be situation specific and vary by gender, as male college students tended to drink more than women when having the intention to search for and attract a sexual partner (Beck et al., 1995). Further research is required; however, it may be that male students have a greater desire to drink for affiliative reasons as the rewards may be greater for men in many college social contexts.

Overall, all motives were associated with higher levels of drinking, but social motives were the only motives that were associated with nonproblematic drinking. It seemed that the Cooper's (1994) two negative reinforcement motives had different relations with drinking between women and men. For men in particular, those who drank for conformity reasons and had high levels of drinking tended to have higher levels of self-consciousness or

social concerns. For female students in particular, those who drank for coping reasons tend to have high levels of alcohol-related problems. It may be that men with psychological distress seek external rewards from drinking, while women seek internal rewards from drinking. Drinking for positive reinforcement and internal rewards, or enhancement drinking, seems to be an important predictor for problematic drinking that is not related to psychological distress.

### ***2.6. Stress and coping***

There have been several studies indicating a positive relationship between stress and problematic drinking in college. For instance, college students with at least a moderate level of stress have greater increases in problem drinking in the previous 3 months than low stress college students (O'Hare & Sherrer, 2000). This study investigated students who were first-time offenders of the university alcohol policy and therefore may not be generalizable to college students. It is possible that those who have been adjudicated for breaking alcohol rules react to stress differently than those who have not been disciplined. Therefore, larger samples including both sanctioned and nonsanctioned students are necessary to make accurate interpretations of the results. Both quantity of stressors and severity of stressors have been found to be related to greater problematic drinking. Camatta and Nagoshi (1995) reported that a greater number of life stressors were correlated with higher levels of alcohol use problems but not with rates of alcohol use. In a recent study of women who had been sexually assaulted, severity of sexual assault was related to greater alcohol consumption (Miranda, Meyerson, Long, Marx, & Simpson, 2002). Further research including men is needed to determine whether this finding is specific to women. A study conducted by Kidorf and Lang (1999) provides some causal evidence of the stress-alcohol relationship in college students beyond self-report. In a laboratory setting, undergraduates drank more in an experimental social stress condition (i.e., delivering a speech on the individual's most undesirable characteristic) than in a baseline condition.

There are some inconsistencies in results from studies examining the stress-alcohol relationship. For example, in a sample of male undergraduates, Rohsenow (1982) did not find a significant relationship between stress and drinking rates. Although this may be due to the small sample size, the study employed a methodology involving self-monitoring of stressful life events and drinking over several months. Such self-monitoring is missing from much of the college alcohol research. Another explanation for the inconsistency may lie in differences regarding the belief that one can cope with stress. The belief that one can successfully alleviate unpleasant moods (negative mood regulation) has been found to be related to lower drinking problems in college students, and this belief has been found to predict drinking behavior (Kassel et al., 2000). Thus, it seems that there is a component related to how you feel you can personally cope with negative mood states that influences the likelihood of problematic college drinking. Coping responses have also been linked to alcohol use in college students. Emotion-focused coping strategies have been associated with increased drinking and greater endorsement of alcohol-related problems (Evans & Dunn, 1995; Karwacki & Bradley, 1996). Coping by seeking social support was implicated as a possible protective factor (Karwacki & Bradley, 1996). There is preliminary evidence that coping strategies vary across male and female college students. One study found that

women with at least moderate levels of stress show disproportionately greater substance use (O'Hare & Sherrer, 2000), indicating that women may have a greater vulnerability for drinking when experiencing psychosocial stressors due to deficiencies in coping. Furthermore, women who have experienced sexual assault may use alcohol to cope with negative affect, as those who report negative reinforcement reasons for alcohol use have higher levels of use (Miranda et al., 2002).

Social learning theory models of college student drinking conceptualize alcohol consumption as a general method of coping with daily demands that may become maladaptive when used excessively (e.g., Maisto, Carey, & Bradizza, 1999). Those who are particularly vulnerable to maladaptive use are those who lack sufficient coping skills or the self-efficacy to deal with daily stressors. According to this theory, one's vulnerability is increased if the individuals expect alcohol to have positive and/or coping benefits. Thus, it seems that stress-related drinking is related to coping motives and tension reduction expectancies as well as one's skills repertoire and self-efficacy to deal with stressors.

Thus, coping motives may help to explain how high levels of stress were related to higher levels of drinking problems, particularly for female college students. It seems that one's ability to cope, or perception of these abilities, may mediate the relationship between stress and drinking. If one has deficiencies in coping skills (or perceives such deficiencies), then the individual may be more likely to use alcohol as a coping device.

## **2.7. Activity involvement**

The activities that one is involved in have been found to be associated with problem drinking in college students. For instance, certain college-related activities, such as belonging to a fraternity (Cashin, Presley, & Meilman, 1998), are associated with greater problem drinking. Activities covered in this section include academic involvement, athletics, Greek organizations, religious involvement, and drinking games.

### *2.7.1. Academic involvement*

Prior research suggests that level of involvement and/or performance in academics during college is associated with drinking behavior (e.g., Brennan et al., 1986b). Grade point average (GPA) was found to be an important predictor of binge drinking (Durkin, Wolfe, & Clark, 1999). Athletes with higher GPAs were somewhat more likely to refrain from in-season drinking than other athletes (Thombs, 2000). On the other hand, McCabe (2002) found that low academic performance, as measured by GPA, was not a significant risk factor for heavy episodic drinking. Instead, academic performance measured by missed classes and late assignments due to drinking was found to be a significant risk factor for heavy and frequent binge drinking. It could be that GPA does not fully assess academic involvement as some students may be able to have an above average GPA with less effort than others. However, these relations among drinking and academic performance could be interpreted as a consequence of problematic drinking rather than a cause and thus should be interpreted with caution. Longitudinal studies should be conducted to determine the causal linkage of low academic performance and problem drinking. Alternatively, the poor

academic functioning may be another aspect of the nonconforming/sensation-seeking type of individual that is at a higher risk for problematic alcohol use.

### 2.7.2. *Athletics*

Although one may perceive athletes as being more health conscious and less likely to take physical risks than nonathletes, the data indicate quite the contrary. According to Hildebrand et al. (2001), college or high school athletic involvement was associated with more drinking, binge drinking, and alcohol-related risk behaviors than college students who have not been college or high school athletes. Further, among this sample of college athletes, former high school athletes, and nonathletes, length of participation in athletics was associated with an increased engagement in alcohol-related risk behaviors. Current or previous athletes also tend to have an earlier age of onset of drinking than nonathletes (Hildebrand et al., 2001), another variable related to greater problem drinking. Similarly, Leichter, Meilman, Presley, and Cashin (1998) found that college student athletes drank more frequently and experienced more negative consequences from drinking than nonathletes. In this study, it seemed that binge drinking increased as level of involvement in athletics increased from nonparticipant to participant to team leader. Male leaders of athletic teams were found to drink more and experience more negative consequences than other members of the same team (Leichter et al., 1998), with female team leaders experiencing more negative consequences than other team members. These results demonstrating the link between level of involvement in athletics and problematic drinking may be related to the importance that the individual places on athletics. In a study of 140 colleges, self-reported endorsement of the importance of athletics was associated with greater heavy drinking, even when controlling for other relevant risk factors (Wechsler, Dowdall, Davenport, & Castillo, 1995; Wechsler, Dowdall, Davenport, & Rimm, 1995). Although these studies have established a relationship among athletics and increased problem drinking, they have not determined the nature of the relationship. However, athletic activities often involve taking risks, as there is often the risk of physical injury. Those who tend to be successful athletes may tend to be risk-takers and therefore engage in risky drinking. On the other hand, time spent in athletics could increase one's sense of invincibility and therefore act as a risk factor for increased problem drinking.

### 2.7.3. *Greek organizations*

Members of fraternities and sororities tend to drink more heavily and frequently and experience more alcohol-related negative consequences than nonmembers (Cashin et al., 1998). Members of Greek organizations tend to view alcohol use more positively than nonmembers. For example, a greater proportion of Greek members tends to believe that alcohol is a vehicle to friendship, social activity, and sexuality than nonmembers (Cashin et al., 1998). Further, both men and women in Greek organizations with reputations for high alcohol use and greater alcohol use according to self-report also viewed their house reputation more positively than other fraternities or sororities along dimensions such as social reputation, attractiveness of members, wealth, and sexual activity (Larimer, Irvine, Kilmer, & Marlatt, 1997). Fraternities and sororities appear to accept higher levels of drinking as normal (Baer, 1994), with fraternity members having the highest perceived norms. These

drinking practices are likely encouraged by Greek organization leaders. The leaders of the Greek organizations appear to set heavy drinking norms as they drink and experience negative consequences from drinking as much or more than average members (Cashin et al., 1998).

The intent of incoming freshmen to join a Greek organization was found to be correlated with higher levels of alcohol use and alcohol-related problems in the last year (Read et al., 2002). As these data were collected early in these students' first year of college, these findings are consistent with a selection effect theory of the Greek system–alcohol use relationship (i.e., that individuals involved in heavy drinking seek heavier drinking environments). However, it appears that heavy drinking associated with Greek organization membership does not persist in the years after college (Sher, Bartholow, & Nanda, 2001), which supports the idea that the high level of problematic drinking seen during Greek involvement is a product of the environment. High levels of problem drinking among Greek members could be related to both a self-selection effect and increased norms as a result of the environment.

#### *2.7.4. Religious involvement*

Religiosity has consistently shown an inverse relationship with alcohol use. Religious commitment had an inverse relationship with frequency of binge drinking in students under the legal drinking age (Durkin et al., 1999). Students who endorsed the belief that "religion is important" had a lower frequency of heavy drinking (Wechsler, Dowdall, Davenport, & Castillo, 1995; Wechsler, Dowdall, Davenport, & Rimm, 1995). In a sample of college students who identified themselves as being affiliated with the Catholic religion, an intrinsic orientation toward religion was related to less drinking and alcohol-related problems for female students (Templin & Martin, 1999). Students with no religious affiliation tended to drink more heavily and frequently than those with a religious affiliation but did not have greater alcohol-related problems (Patock-Peckham, Hutchinson, Cheong, & Nagoshi, 1998). Thus, religiosity has a relationship with heavy alcohol use.

Some have asserted that this relation between religiosity and alcohol consumption is influenced by the impact of sensation seeking on religiosity (e.g., Ellis, 1987). However, research investigating this hypothesis found that religiosity was an independent predictor of drinking, with sensation seeking having no impact on the relationship between religiosity and alcohol use (Forthun, Bell, Peek, & Sun, 1999). Thus, it seems that religiosity is a construct independent from sensation seeking. Further research replicating this finding is needed, particularly using a measure of sensation seeking that does not include questions specifically asking about alcohol use.

#### *2.7.5. Drinking games*

"Drinking games" are a specific social interaction common on college campuses that have been described as competitions between individuals with rules intended to ensure consumption of large amounts of alcohol in a short time (Newman, Crawford, & Nellis, 1991). Among more than 2,800 light-to-moderate drinkers, 66% had participated in a drinking game during the previous year, whereas 93.6% of 1,028 heavy drinkers had participated in a drinking game in the previous year (Engs & Hanson, 1993). Individuals who participated

in drinking games consistently reported greater levels of drinking and drinking-related problems (Engs & Hanson, 1993; Johnson, Wendel, & Hamilton, 1998; Wood et al., 1992), including instances of sexual victimization (Johnson et al., 1998). For both moderate and heavy drinkers, a greater percentage of those participating in drinking games experienced alcohol problems than those who did not (Engs & Hanson, 1993). However, research suggests that drinking games increase risk for alcohol problems primarily among light-to-moderate drinkers (Engs & Hanson, 1993; Johnson et al., 1998). Playing drinking games significantly increased the probability of experiencing most drinking-related problems for moderate drinkers, while heavy drinkers had only an increased probability of experiencing less than one-third of the alcohol-related problems (Engs & Hanson, 1993). Nagoshi, Wood, Cote, and Abbit (1994) reported that the association of drinking game participation with alcohol problems was mediated by frequency of heavy drinking. The authors proposed that drinking games might function as a risk factor by teaching inappropriate alcohol expectancies and social norms. Further research is needed, however, to determine the plausibility of this assertion.

Overall, it seems that greater involvement in academics and religion is associated with less problem drinking, while involvement in Greek organizations, athletics, and drinking games are generally associated with more problem drinking. The causal nature of these relationships cannot necessarily be determined, but indicated the potential importance of influence of perceived social norms, social context, and the environment in college drinking behavior.

## ***2.8. Peer and family influence***

As college drinking behavior is unique and tends to remit following college (Zucker, 1987), it is often presumed that the environment and “peer pressure” are important influences in problem drinking. Therefore, the literature investigating the influence of peers and family are reviewed below.

### ***2.8.1. Drinking norms***

In this section, drinking norms will mostly focus on the perceived norms of others. Perceived drinking norms refer to the ratings that individuals make about the acceptability and typicality of various drinking behaviors (Baer, 2002). Often, the perceived norms deal with attitudes toward initiation of drinking, drinking quantity or frequency, binge drinking, drinking to intoxication, and/or behaviors associated with drinking.

**2.8.1.1. Peers.** The influence of peers’ attitudes and behaviors about alcohol seems to be related to one’s alcohol consumption (Larimer et al., 1997; Reis & Riley, 2000). An atmosphere in which heavy drinking is encouraged and perceived as normative and positive tends to have more heavy drinkers than peer groups in which heavy drinking is not encouraged. For instance, students who associate with more friends who drink tended to consume more alcohol than those students who associate with fewer friends who drank according to the student’s self-report (Martin & Hoffman, 1993). For first-year college men, large social networks, greater amounts of social contact, and greater social competence have been found to predict alcohol use (Fondacaro & Heller, 1983). It is possible that those

who are more sociable and have more social contact drink greater quantities of alcohol merely because of greater opportunities to drink due to being exposed to more situations where alcohol is present. Studies examining modeling of drinking behavior, a related type of peer influence, have found that male students tend to match the drinking rate of an experimental confederate modeling heavy or light drinking (Collins & Marlatt, 1981; Collins, Parks, & Marlatt, 1985). The exception to this trend was a condition in that the confederate was unsociable and modeled light drinking. In this condition, the male students tended to engage in heavier drinking rather than matching the confederate's light drinking (Collins et al., 1985). These studies provide observational evidence of the impact of peer modeling on one's drinking behavior for male college students.

Although modeling provides evidence of a causal connection between behavior of peers and individual drinking, there is some evidence that increases in drinking behavior may also be related to biased perceptions of overall drinking norms. Biases in perceived norms for drinking frequency, quantity, and problem involvement have been well documented (e.g., Baer, 2002; Baer & Carey, 1993). Students who tend to overestimate amount of alcohol consumed by their peers are also more likely to consume more alcohol themselves (Agnostinelli, Brown, & Miller, 1995). Heavy drinking students tend to perceive other students' attitudes about drinking as more lenient (e.g., Perkins & Berkowitz, 1986), college students overall have consistently estimated the typical drinking behavior of other college students as greater than their own drinking behavior (Baer & Carey, 1993; Baer, Stacy, & Larimer, 1991), and perceptions of specific group norms were higher than the self-reported means of the groups (Baer & Carey, 1993; Baer, Kivlahan, & Marlatt, 1991). Furthermore, college students who were members of Greek organizations with reputations for heavy drinking generally perceived high-risk alcohol use as being more acceptable than members of houses with low drinking reputations (Larimer et al., 1997). In the 1999 College Alcohol Study, Wechsler and Kuo (2000) found that the median number of drinks considered to be "binge drinking" among 14,000 college students across 40 states to be 6 drinks for men and 5 drinks for women in one sitting. On further examination, it was found that abstainers tend to have a similar definition of binge drinking as researchers typically do (i.e., 5 drinks for men, 4 drinks for women) but that frequent binge drinkers tend to identify 8 drinks for men and 6 drinks for women as binge drinking. In fact, one in three frequent binge drinkers defined binge drinking for men as 10 or more drinks in one sitting. This study included a very large sample with variability in demographic factors, providing strong evidence that greater problem drinking is related to higher perceived drinking norms. Thus, it seems that college students overestimate drinking norms, and the perceived norms are related to one's drinking behavior. It is not known, however, whether these biases for heavier drinking norms were formed before drinking involvement or after initiation of drinking as the research is based on self-report in one session.

The literature reveals a consistent pattern in which perceived norms for alcohol use and alcohol-related consequences are related to higher levels of alcohol use and alcohol-related problems (Perkins & Wechsler, 1996; Read et al., 2002; Wood et al., 1992). More permissive drinking norms measured by a five-item index (i.e., agreement with statements such as "Students here admire nondrinkers") were associated with greater self-reported alcohol abuse, even after controlling for personal attitudes regarding alcohol use (i.e., "In your

opinion, how much do you think is appropriate for a college student to drink in each of the following situations?" (Perkins & Wechsler, 1996). Higher campus drinking norms had a much greater impact on drinking behavior when the student personally believed that drinking enough to get intoxicated is acceptable in many circumstances than for students that believed in abstinence or very restrained drinking. However, Read et al. (2002) asserted that there may be differences in the relations between perceived norms and problem drinking across gender. In a study of entering freshmen, there was much stronger association among perceived norms, alcohol use, and consequences for men than women. It is possible that men are more likely to conform to perceived drinking norms. Another possibility is that this pattern is related to documented differences in drinking rates in men and women and different absorption levels of alcohol into the bloodstream across gender (Perkins, 2002) rather than indicating differential relationships between gender and perceived norms. On examining gender-specific perceived norms of peer drinking among college students, Reis and Riley (2000) found that perceived norms explained the greatest amount of variance in weekly drinking for both men and women. Thus, it may be that previous literature has not considered these gender differences in alcohol norms.

According to Read et al. (2002), perceived norms may not strictly be a function of the college environment but rather an extension of norms developed before college. Likewise, Baer (1994) presented evidence that beliefs about drinking norms existed before college by examining drinking norms at two points. Therefore, it seems that perceived norms regarding college drinking life are developed long before starting college and that heavy drinking students may choose friends and environments with perceived pro-drinking norms and permissive attitudes toward drinking. The college environment likely has additional effects on the precollege norms beyond selection effects. These notions are supported by research finding that both age of onset of drinking and perceived peer norms were able to discriminate drinking among college athletes but that age of onset was a significantly greater discriminator than perceived norms (Thombs, 2000). More longitudinal research is necessary with larger samples to gain a greater understanding of the influence of drinking norms on college drinking.

**Parents.** Perceptions of parents' attitudes toward drinking may play a role in a college student's drinking norms. According to a review by Brennan et al. (1986b), most studies on parent influence found a weak positive relationship between students' and parents' drinking behaviors and attitudes toward drinking. A more recent study found that more communication with mothers about alcohol was correlated with less positive beliefs about drinking consequences (Turrisi et al., 2000). Due to the correlational nature of this study, it is not clear that the results give support for the parental influence of college drinking attitudes through greater contact. It is also a possibility that nondrinking or light drinking students were more likely to communicate with their mothers than heavy drinking students. Thus, there is no strong evidence for a relationship between parental influence and college drinking. It is possible that the effect of parental influence on drinking is greatest before college. Thus, parental attitudes may play a small role in college drinking behavior, but the influence of peers clearly has a greater impact.

### 2.8.2. *Social context of drinking*

The environment where drinking itself takes place has important influences on drinking behaviors. For instance, there have been associations between larger drinking groups and greater consumption of alcohol (Perkins & Berkowitz, 1986), particularly with men (Sencak, Leonard, & Greene, 1998). In addition, presence of women in small drinking groups may moderate drinking in men (Sencak et al., 1998). Settings where social contact and drinking are frequent often have increased modeling of drinking, peer pressure to partake in drinking, and easy availability of alcohol (Baer, 1994) that may lend itself to greater rates of problematic drinking. High-intensity drinkers (i.e., those who drink alcohol at least weekly, consume at least 5 drinks on a typical drinking occasion, and become drunk at least monthly) are more likely to drink in contexts of social facilitation (e.g., drinking at bars, with friends, and at parties) than low-intensity drinkers (Beck et al., 1995). Thus, being in large social groups with frequent socialization and the presence of alcohol is related to greater problem drinking. However, the direction of the relationship is unclear and likely involves an interaction of many variables. Living environment and activity involvement also demonstrate the interactions of peer influence, family influence, and social contexts in college problem drinking.

### 2.8.3. *Living environment*

Living environment (the student's living unit) has been found to relate to alcohol consumption (e.g., Martin & Hoffman, 1993). Students living in on-campus residences, such as fraternities, sororities, or residence halls, tend to drink more, more often engage in "binge drinking," and report more alcohol-related negative consequences than those living with their parents (Martin & Hoffman, 1993; Montgomery & Hammerlie, 1993; Valliant & Scanlan, 1996). Wechsler et al. (2002) presented data from multiple Harvard School of Public Health College alcohol studies including over 53,000 participants and 140 colleges that provided compelling evidence for the impact of living environment on problem drinking. Students living in substance-free dormitories or off campus with their parents had the lowest rates of binge drinking and negative secondhand effects of alcohol use compared with individuals living in dormitories allowing drinking, fraternities, or sororities and with those living off campus without parents (Wechsler et al., 2002). Overall, residents of fraternities and sororities generally drank more and experienced more negative secondhand effects than all other students (Wechsler et al., 2002).

There may be gender differences in the effect of living environment. Although Wechsler et al. (2002) did not examine such gender differences, another study revealed that living in a fraternity was a risk factor for greater binge drinking frequency, but living in a sorority house was not a significant risk factor (McCabe, 2002). Valliant and Scanlan (1996) found that male students living off campus in single dwellings or apartments drank more alcohol than male students who lived on campus or off campus with their parents, with no such pattern for female students. It also appears that coed living environments may have a higher incidence of drinking problems. For instance, students living in coed dormitories had greater alcohol-related negative consequences than those living in single-gender dormitories (Harford et al., 2002). However, all the above-mentioned relationships may be due

to self-selection effects in that students who tend to drink heavily could choose environments that were more conducive to that behavior. Those choosing to live with their parents or in substance-free dormitories may be more conventional and have less desire to consume alcohol or engage in other risky behaviors.

Results of the studies mentioned suggest that students living off campus do not have the same risk for problem drinking than those who live on campus. Proximity to parents appear to play a role in protecting the student from alcohol problems, as evidenced by the lower rates of drinking problems and rates by those students who live with their parents. Again, this may be due to selection effects. Alternatively, it could be that parents do not tolerate negative alcohol-related behaviors and/or parents are able to monitor students who live at home more than those who do not live at home. In addition, recent work indicates that living off campus may not serve as a protective factor against all aspects of problem drinking. Harford et al. (2002) found that students living on campus tended to have greater alcohol-related problems than those living off campus (with or without parents); however, those living off campus were more likely to drink and drive. Therefore, living off campus may be a risk factor for driving while under the influence of alcohol. Although students living off campus may not experience many of the other problems associated with drinking, driving under the influence of alcohol has important legal, physical, and social consequences that should not be ignored.

Although there have been many studies linking the influence perceived norms, social context, and the environment to college problem drinking, further research is necessary to adequately determine whether the apparent effects of peer influence and drinking environment are due to self-selection effects (i.e., those who drink heavily tend to choose environments and peer groups where heavy drinking is encouraged).

### **3. Predicting future drinking problems in college students**

Although many college students discontinue problematic drinking after college, even those engaging in very high-risk drinking behaviors, there are still individuals who continue or progress in their problem drinking (Vik et al., 2000). Further, although problem drinkers are more likely than nonproblem drinkers to show significant drinking problems 7 years (O'Neill & Sher, 2000) or even 20 years later (Fillmore, 1974, 1975), only a small portion of problem drinkers develop these significant problems. Thus, it seems important to address the variables that predict future problem drinking. There has been some research indicating that variables measured during college, such as role transition, drinking alone, and certain personality characteristics, may be related to later problem drinking. Further, Zucker's (1987) developmental model of alcoholism is discussed in relation to college drinking.

#### **3.1. Role transition**

According to Kandel's (1980) role socialization theory, making role transitions may help to decrease alcohol involvement. The role socialization explanation is compatible with the phenomenon of developmentally limited alcoholism presented by Zucker (1987). Researchers have investigated the possible links among role transition variables such as marriage,

parenthood, and entering the workforce in students' future drinking patterns. Gotham, Sher, and Wood (1997) conducted a longitudinal study specifically assessing students during their senior year in college and then 3 years later after all had obtained bachelor's degrees. The results of this study indicate that being employed full time predicted decreased postcollege drinking, particularly for men, when controlling for baseline drinking. A different pattern emerged for marriage, in that there were significant associations between drinking and marital status, but this variable did not predict drinking when controlling for baseline drinking. It may be that those who marry shortly after college are qualitatively different from those students remaining unmarried as they have lower drinking frequency during college and after college. It could be that these students tend to be more conventional and therefore at a lower risk for problem drinking in both college and beyond. Gotham et al.'s results do support the role socialization hypothesis in that gaining employment appears to be a role transition that influences one's drinking behavior.

### ***3.2. Drinking alone***

According to Christiansen, Vik, and Jarchow (2002), engaging in solitary heavy drinking not only is an atypical behavior and risk indicator among college students but also indicates a vulnerability to future alcohol problems. Individuals who drank alone also had greater levels of emotional coping expectancies and depressive symptoms as well as lower emotional relief self-efficacy. Thus, the phenomenon of drinking alone seems to be associated with the tendency to use alcohol to manage and/or escape negative emotions in such a way that leads to future alcohol problems, as will be discussed in Section 3.3. Heavy drinking when alone may also characterize students who have progressed to a greater severity of drinking behavior (Christiansen et al., 2002).

### ***3.3. Personality characteristics and Cloninger's (1987) alcoholism subtypes***

Classification of alcoholism "types" may provide information related to the personality characteristics that lead to alcoholism. For instance, Cloninger (1987) describes two subtypes of alcoholism: Type 1, marked by a later onset and a personality style of harm avoidance, and Type 2, characterized by an early onset and novelty seeking personality style (Galen, Henderson, & Whitman, 1997). Another study supports the two types of alcoholism but also indicates how harm avoidance and novelty seeking may relate to alcoholism risk in different ways (Cloninger, Sigvardsson, Przybeck, & Svrakic, 1995). Harm avoidance was found to inhibit the initiation and frequency of drinking but increased the risk of developing problems once frequent alcohol consumption has begun. Novelty seeking increased the risk of drinking initiation as well as frequent and problem drinking. Thus, personality styles may be important in predicting future alcohol problems.

According to a study investigating adult "alcoholics," these individuals scored higher than their peers as college students 13 years earlier on measures of autonomy, change, aggression, sensation seeking, impulsivity, gregariousness, nonconformity, and reduced caution (Loper, Kammeier, & Hoffman, 1973). In another longitudinal study, relatively extraverted individuals were more likely to continue a pattern of frequent intoxication at the second assessment point (Gotham et al., 1997). These results seem to support the Type 1 drinker as being at risk for future alcohol problems. As previously mentioned, it appears

that a diagnosis of an anxiety disorder during the first year of college increases one's risk of developing alcohol dependence at year 4 or 7 (Kushner et al., 1999). Further, Gotham et al. (1997) reported that being less open to experience was associated with less postcollege drinking. This would be similar to the Type 2 drinker, and it would therefore seem to have an increased severity. According to Baer (2002), alcohol-related problems related to anxious and depressive symptomatology may pose as a greater risk for chronic problems over the long term.

### ***3.4. Zucker's (1987) developmental model***

Zucker (1987) proposed a developmental model that includes four types of "alcoholism" that are helpful in explaining college drinking behavior and the presence of later problems (or lack thereof). The first type is referred to as "antisocial alcoholism" and is characterized by an early onset of both alcohol-related problems and antisocial behavior. It is further believed to have a genetic basis and a poor prognosis. According to Baer (2002), this type is not likely to be seen in college students as many of these individuals would not enter college. On the other hand, "developmentally limited alcoholism" is consistent with the heavy drinking, typically seen in college students, which decreases after graduation. Developmentally limited alcoholism is characterized by frequent heavy drinking in late adolescence that tends to remit to social drinking after finishing college and assuming adult responsibilities. This type is concerning in that this drinking pattern puts the individual at risk during the college years but is not as concerning as far as determining future drinking problems. However, there are two other alcoholism types that Zucker proposes that are of concern to predicting college students future drinking problems. The first is "negative affect alcoholism," which is characterized by the use of alcohol for mood regulation and to enhance social relationships. This alcoholism type and Cloninger's Type 1 alcoholism have some similar attributes. Negative affect alcoholism is believed to be less associated with antisocial behavior, develop more slowly, and occur primarily among women. Negative affect alcoholism could likely be integrated with the risk factors of the neuroticism personality factor, coping motives, and tension reduction and social assertiveness expectancies. Finally, "developmentally cumulative alcoholism" is characterized by initial drinking that is limited and induced by cultural influences but that produces alcohol dependence over a lifetime of engaging in the drinking behavior. This is particularly concerning with college students as the environment has at least some influences on college students' increased drinking.

Although there is a limited amount of research examining the prediction of postcollege drinking problems, it seems that there are some associations among role transitions, drinking alone, certain personality characteristics, and future problem drinking. Zucker's (1987) developmental model of alcoholism seems to combine these factors together into four types of alcoholism that considers both personality and environmental factors. Further research examining Zucker's model is necessary to determine the validity and utility of these four types of alcoholism. Determination of alcohol types could inform prevention techniques and possibly inform more individualized strategies of intervention.

#### 4. Conclusions

Although many individuals “mature out” of problematic college drinking, students put themselves and others at risk for negative consequences due to their high-risk drinking behavior. Thus, problematic college drinking represents a major public health concern. Additionally, there are some individuals who continue problematic drinking after college. Due to the high variability in drinking among college students, the primary goal of the current paper was to examine the primary psychosocial variables that predict problem drinking and account for variation among college student drinkers. The review began with internal influences related to problem drinking and led up to those perceived as external influences. The following variables were reviewed regarding their relationship with problem drinking in college students: demographic variables, personality, drinking history, alcohol expectancies, drinking motives, stress and coping, activity involvement, and peer and family influence. The review also addressed potential variables related to problematic drinking after college.

Overall, the research indicated that there were two subsets of college students that are at risk for problem drinking. The first subset was that of the sensation seeking personality type, consisting mainly of students who drank for social or enjoyment reasons. Individuals in this subset were also more likely to be male, Anglo-American, and involved in Greek organization or other social environments that have high drinking norms. The second subset was that of the neurotic personality type, consisting mainly of students who drank for coping or conformity reasons. Individuals in this smaller subset appeared more likely to respond to distress by drinking, experience negative affect, and be female students. Furthermore, the review indicated that perceived drinking norms and attitudes about drinking may influence college drinking behavior. However, these norms regarding drinking probably developed before college, with the college environment itself having some additional effect on drinking norms and attitudes (Sher et al., 2001).

The variables associated with college drinking seem to vary at levels dealing with one's personality and coping mechanisms, one's thought processes about drinking, and the environment. The way that the environment impacts one's drinking in college is likely influenced by one's personality style, coping mechanisms, and thought processes. It seems that expectancies and drinking motives may serve as explanations for the pathways from certain personality types to problem drinking in the college setting. The trend is similar in predicting future drinking, in that variables associated with future drinking were role transition (environmental and personality), drinking alone (may be related to drinking for coping reasons and psychological distress), and personality characteristics. Thus, it seems that interventions and prevention programs would need to reach college students at all three levels—the environment (e.g., environmental management) (Gebhardt, Kaphingst, & DeJong, 2000), individual personality traits or psychopathology (e.g., psychotherapy targeting problematic traits), and cognitive processes (e.g., Alcohol Skills Training Program or ASTP [Fromme, Marlatt, Baer, & Kivlahan, 1994] or expectancy challenge techniques [Darkes & Goldman, 1993]). However, further research is necessary to determine whether the apparent effects of the environment are instead due to self-selection effects (i.e., heavy drinking students choose environments that are pro-drinking).

*Limitations and future directions*

One limitation in the research reviewed here is that much of the research involved self-report questionnaires given in one session. According to Baer (2002), there are few observational studies or longitudinal studies of college student drinking in relation to individual differences. Indeed, it seems that there is a pressing need for more observational and longitudinal studies of college drinking behavior and associated psychosocial variables. The common practice of employing self-report questionnaires may limit causal interpretability of the results. Further, the generalizability is often compromised in studies due to the use of convenience samples, such as students in the psychology subject pool. Fortunately, there are several national level studies of college student drinking behavior that do not have this limitation (see Meilman, Cashin, McKillip, & Presley, 1998; Wechsler et al., 1998).

Further, according to a review conducted by Hingson et al. (2001), none of the self-report instruments recording students' binge drinking specifically asked about the duration of the drinking occasions. This is a limitation in that blood alcohol content cannot be ascertained without this information. This limitation is relevant to research in problematic drinking, as there are individual differences in alcohol absorption. As addressed in the review, gender differences in alcohol absorption into the bloodstream may be causing data to be misinterpreted. Women can typically reach the same blood alcohol concentration as men while drinking less alcohol due to biological differences in body weight, fat-to-water ratios, and metabolic processing (Perkins, 2002). Thus, information is needed related to gender, height, and weight to provide estimates of blood alcohol concentration. In addition, many of the studies requesting information about drinking amounts have a cutoff category that gives incomplete information (e.g., "5 or more drinks" as the largest category) and may result in an underestimation of college drinking rates. Future research should allow students to give larger amounts of drinks to get an accurate description of college drinking behavior.

Another limitation is that many measures of sensation seeking include items that explicitly ask about alcohol use. The primary measure used in recent sensation seeking research (Arnett, 1994), the Sensation Seeking Scales (Zuckerman, 1979), includes a disinhibition subscale that includes such alcohol use items (Darkes et al., 1998). According to Darkes et al. (1998), there seems to be criterion contamination that may be influencing the results examining drinking and sensation seeking. Arnett (1994) has developed a scale that does not include such items, and this could be used in future research to avoid problems with criterion contamination.

Thus, it seems that future research should incorporate more complex research design strategies, include measures to assess blood alcohol concentration, eliminate cutoff categories, and include measures of sensation seeking that do not include items explicitly asking about alcohol use. Another important future direction may be to further examine the correlates of problem drinking after college as the research in this area appears to be limited. Several studies can be conducted to circumvent these limitations.

First of all, it is recommended that there be a study with a longitudinal research design initiating before high school, with assessment points in college and in postcollege years. Ideally, there would be a follow-up assessment at least 20 years after college to determine

if there are any late onset alcohol problems. Each assessment point would include questionnaires assessing domains of interest (living environment, activity involvement, alcohol expectancies, etc.), with monitoring of drinking behavior at intervals between assessment points. Drinking monitoring would include information about gender, weight, height, and time spent drinking to determine estimated blood alcohol concentrations. In addition, no cutoff categories would be used in identifying drinking quantity, frequency, or time spent drinking. To reduce criterion contamination, a measure such as the Arnett Inventory of Sensation Seeking (Arnett, 1994) should be used. Obviously, this would be a difficult study with a high attrition rate. Another longitudinal design could involve assessing incoming college students in the summer before college entrance and then follow-up with assessment points throughout college and beyond (see Baer et al., 2001 for a template of such a longitudinal study design). It would be important to have a large, diverse sample of students. A third design for future research is an observational design that includes blood alcohol concentration breathalyzer tests in a laboratory. It is recommended that this study includes multiple assessment points and examines various contexts, affect states, and stress levels.

Although there has been a plethora of research investigating college drinking, there is still some ambiguity in the pursuit for a comprehensive understanding of problem college drinking. Many psychosocial factors seem interrelated, and it is difficult to determine etiological factors. Understanding the variables related to problem drinking is essential in identifying those in need of services and in informing prevention and intervention strategies.

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