

The Epidemiology of Binge Drinking Among College-Age Individuals in the United States

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Rates of alcohol consumption continue to be a concern, particularly for individuals who are college age. Drinking patterns have changed over time, with the frequency of binge drinking (consuming four/five or more drinks for women/men) remaining high (30% to 40%). Young adults in the college age range are developmentally and socially at higher risk for drinking at binge levels. Changes in autonomy, parental control, norms, and attitudes affect binge drinking behaviors. This article reviews those changes, as well as the individual and environmental factors that increase or decrease the risk of participating in binge drinking behaviors. Risk factors include risky drinking events (e.g., 21st birthdays), other substance use, and drinking to cope, while protective factors include religious beliefs, low normative perceptions of drinking, and use of protective behavioral strategies. Additionally, this article discusses the physical, social, emotional, and cognitive consequences of consuming alcohol at binge levels. Alcohol policies and prevention and intervention techniques need to incorporate these factors to reduce experiences of alcohol-related problems. Targeting policy changes and prevention and intervention efforts toward young adults may increase effectiveness and prevent both short- and long-term consequences of binge drinking.

Key words: Alcohol consumption; binge drinking; consequences; risk and protective factors; young adults

Binge drinking, particularly among college-age individuals, has been a significant topic of research for more than 20 years because of associations between greater quantity and frequency of alcohol consumption and alcohol-related consequences. To identify factors associated with binge drinking over time, several large-scale studies have assessed trends in binge drinking among young adults. This article aims to summarize those trends and the developmental and social factors that impact the likelihood of, the risk and protective factors related to, and the negative alcohol-related consequences of binge drinking behaviors. Some studies examined young adults who are not in college, but the major-

ity of the literature regarding binge drinking focuses specifically on college students. Further, there is variability in the definition of college students. Some studies sampled only full-time students from four-year institutions, whereas other studies included part-time and community college students.

The term “binge drinking” has a somewhat controversial history. The term was originally defined by Wechsler and colleagues as five or more drinks for men, or four or more drinks for women (5/4+), on a single occasion.¹ Criticisms of this conceptualization of binge drinking were based largely on the substantial variability in blood alcohol concentrations (BACs) due to differences in weight and dura-

tion of consumption. When individuals who met these binge drinking criteria had consumed the alcohol over a long period of time, they did not reach BACs higher than .08%.^{2,3}

In 2004, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) provided a revised definition of binge drinking, acknowledging that consuming 5/4+ drinks in a 2-hour time period would result in a BAC of at least .08% for most individuals. Although subsequent questions continue to be raised regarding the validity of defining binge drinking at 5+ or 5/4+ on one occasion, these are still the most commonly used definitions in the literature. Research covered in this review includes studies on binge

drinking that use the 5/4+ criteria or a BAC of at least .08%.

Trends in Young Adult Binge Drinking Rates

Binge drinking among young adults has concerned researchers and educators for decades, prompting multiple national initiatives to track patterns in binge drinking. The longest continuous running national survey of drug and alcohol use among adolescents and young adults is the Monitoring the Future (MTF) study, which is funded by the National Institute on Drug Abuse and conducted by the University of Michigan's Institute for Social Research.⁴ Approximately 15,000 high school seniors in 133 schools are surveyed each year, and, since 1976, a subset of about 2,400 have been followed biennially by mail. Survey results indicate that the rate of self-reported college student binge drinking in the previous 2 weeks dropped from 1980 (44%) to 1993 (40%) and continued to decrease through 2014 (35%). Estimates for college student engagement in extreme binge drinking, defined as consuming 10 or more drinks on one occasion in the previous 2 weeks, varied from 14% in 2005 to 20% in 2014.

Another national survey assessing college student binge drinking is the Substance Abuse and Mental Health Services Administration's (SAMHSA) National Survey on Drug Use and Health (NSDUH), which includes yearly assessments of 60,000 to 70,000 individuals ages 12 and older. Results indicate that for young adults ages 18 to 25, rates of binge drinking in the previous 30 days decreased slightly from 44.6% in 1988 to 37.7% in 2014.⁵

The Core Alcohol and Drug Survey sampled more than 140,000 students and found a slight decline in the percentage of students who binge drank in the previous 2 weeks, from 45.9% in 2006 to 43.9% in 2013.^{6,7} The College Alcohol Survey (CAS)

also attempted to assess student drinking rates. At 120 colleges, the CAS measured alcohol use among college students at four time points between 1993 and 2001.⁸ The survey included more than 14,000 students and provided the first gender-specific measure of binge drinking (i.e., 5/4+ drinks for males/females). Contrary to findings from the MTF study and the Core Alcohol and Drug Survey, the CAS found little change between 1993 (43.2%) and 2001 (44.5%) in the number of students reporting binge drinking in the previous 2 weeks.⁹

The most recently initiated nationwide survey of college student alcohol use is the National Epidemiologic Survey on Alcohol and Related Conditions. This survey began the first of three waves of data collection in 2001, which included data from approximately 43,000 individuals.¹⁰ Prevalence rates, only reported for 2001, indicate that 57% of 18- to 24-year-olds binge drank in the previous year, and 40% binge drank 12 or more times in the previous year.

College attendance, gender, and ethnic variations in binge drinking have been identified. A number of studies have examined differences in alcohol use between college and same-age noncollege peers, consistently finding higher rates of heavy drinking and alcohol-related problems among college students than among noncollege peers.¹¹ The annual prevalence of alcohol use reported in the MTF study suggested small differences between male and female drinking rates and modest decreases over time.⁴ However, a declining gender gap exists for binge drinking rates, with female binge drinking (i.e., 4+) decreasing from 31% in 1988 to 26% in 2014, and male binge drinking (i.e., 5+) decreasing more substantially, from 52% to 43%.

Currently, the MTF study does not report racial or ethnic differences in binge drinking among college students. However, the U.S. Centers for Disease Control and Prevention reported that more White college stu-

dents engaged in binge drinking in the previous 30 days (31.6% of females and 49.4% of males) than Hispanic students (22.6% of females and 39.9% of males).¹² Also, African American students (6.1% of males) were less likely to report binge drinking than White students (22.8% of males), although this difference was less pronounced among females.

Rates of binge drinking have also been assessed in military samples. Starting in 1980, the U.S. Department of Defense issued several large-scale, anonymous health surveys (most recently called the Health Related Behaviors Survey) to active-duty military personnel, with the first assessment of binge drinking appearing in 1998. Rates of binge drinking for military personnel overall increased from 35% in 1998 to 47% in 2008.¹³ The 2008 survey sampled more than 28,000 service members and found that young adult military personnel (ages 18 to 25) had the highest rates of frequent binge drinking (once a week or more) at 26%.¹⁴ This is significantly higher than the rate for same-age civilians (16%), as reported in the 2007 NSDUH.¹⁵ Rates of binge drinking also differ by military branch.¹⁴

Developmental and Social Factors

Developmental and social factors are important contributors to binge drinking among college-age adults. The college-age years (approximately ages 18 to 24) correspond with the developmental stage widely referred to as "emerging adulthood."^{16,17} Dramatic cultural changes in the United States and other countries with similar socioeconomic structures have occurred over time. Arnett notes that post-high school education rose from 14% in 1940 to more than 60% in the mid-1990s.¹⁶ College attendance has resulted in the delay of traditional adult responsibilities. Consequently, in recent decades this developmental period has become a time when individuals

explore new freedoms and experiment with behaviors that were previously less accessible, including alcohol consumption.^{18,19}

In their seminal paper, “Getting Drunk and Growing Up: Trajectories of Frequent Binge Drinking During the Transition to Young Adulthood,” Schulenberg and colleagues identified five distinct trajectories of binge drinking that occur in young adults ages 18 to 24.²⁰ This analysis was one of the first to use a national sample to identify distinct patterns of changes in binge drinking over time. The national sample included four consecutive waves of data from the MTF study. More than 90% of the sample was categorized as engaging in no binge drinking during any wave (35.9%). Or, they were categorized as one of five binge drinking trajectories:

1. Rare (16.7%): binge drinking during at least one wave but no frequent binge drinking, defined as two or more binge episodes in the past 2 weeks.
2. Decreasing (11.7%): frequent binge drinking during Wave 1 and decreasing or no frequent binge drinking by Wave 4.
3. Fling (9.9%): frequent binge drinking during Wave 2 or Wave 3 but no binge drinking in Wave 1 or Wave 4.
4. Increasing (9.5%): no frequent binge drinking during Wave 1 increasing to frequent binge drinking by Wave 4.
5. Chronic (6.7%): frequent binge drinking throughout Waves 1, 2, 3, and 4.

Most young adults reported binge drinking during at least one of the four assessment waves, but less than half of the sample drank at rates that could be considered problematic.²⁰ Young adults in the Increasing and Chronic categories were identified as having the most difficulty navigating the transition to adulthood. Identified trajectories were associated with stability and

changes in alcohol problems, attitudes regarding heavy drinking, and heavy drinking or drug-using peers.

Interrelated factors associated with increased heavy drinking and alcohol-related problems include moving out of the parent home, going to college, and decreased parental involvement, each of which has a unique contribution. Moving out of the parent home contributed to the risk of increased drinking, but additional risk was found for students who lived on campus.²¹ White and colleagues found that living in a college environment contributed to increases in heavy drinking more than all the other developmental factors they examined.²² Further, although peer influences are paramount among college students, one study found that parental involvement played a protective role in reducing the likelihood of problem drinking.²³

For young adults ages 18 to 24, many of the factors attributed to high rates of binge drinking are social in nature. Perceptions and overestimations of the prevalence and approval of heavy drinking among one’s peers have been consistently documented and associated with heavier drinking. Reducing normative misperceptions has been the most consistently supported brief intervention strategy for reducing heavy drinking among young adults. Most studies that successfully used such interventions to reduce perceived norms also demonstrated reductions in drinking.²⁴⁻²⁸

The vast majority of research on the influence of social norms on heavy drinking has been done using college samples. Similar results have been found in the general adult population, with heavy drinkers more likely to view heavy drinking as normative and to overestimate drinking norms.²⁹ In a large general population study of adults who drank alcohol at least monthly ($N = 14,009$), age was negatively associated with normative misperceptions of drinking.³⁰ However, the magnitude of the correlation was only .07, suggesting that

age is not a strong predictor of normative perceptions of drinking.

The MTF study collected data (for ages 18 to 30) on perceived close-friend disapproval of respondents’ binge drinking once or twice per weekend. Respondents ages 19 to 22 and 23 to 26 reported less disapproval from their friends (54.5% and 52.3%, respectively) relative to respondents ages 18 (65.6%) and ages 27 to 30 (57.1%).⁴ Few studies have directly examined perceived norms and their influence on college versus noncollege young adult binge drinking, but the available evidence suggests perceived norms have less influence on noncollege young adults.³¹

Related to social norms, membership in specific groups has been associated with higher rates of binge drinking. Foremost among these are college fraternity or sorority affiliation,³²⁻³⁴ participation in collegiate athletics,^{35,36} and being in the military, especially the U.S. Army or U.S. Marines.^{14,37,38}

Risk and Protective Factors

Person-level risk factors. Demographic factors such as age, sex, and race have been linked to binge drinking rates among college students. Individuals who began drinking before age 16 were found to be more likely to binge drink in college.³⁹ An examination of MTF data found that, among recent cohorts, individuals entering the 18 to 26 age range reported less binge drinking than previous cohorts, and individuals leaving the 18 to 26 age range reported more binge drinking than previous cohorts.⁴⁰ Several longitudinal studies found that male college students were more likely than female students to binge drink.^{41,42} Also, studies have shown that White college students were more likely to engage in binge drinking than non-White students.^{39,43}

Personality traits and individual difference variables have also been identified as risk factors for binge drinking. A longitudinal investigation

using MTF data from 18- to 24-year-olds found that individuals lower in self-efficacy had a greater likelihood of engaging in binge drinking over time.⁴² Similarly, another longitudinal study among adults ages 18 to 31 found that, across time points, problem drinkers scored higher on disinhibition.⁴¹

Binge drinking also has been positively correlated with neuroticism-anxiety and impulsive sensation-seeking. In particular, one study found that women who engaged in binge drinking tended to score higher on neuroticism-anxiety, and men who engaged in binge drinking were more likely to score highly on impulsivity and sensation-seeking.⁴⁴ Another study found that binge drinkers tended to be less conscientious and more thrill-seeking than those who did not engage in binge drinking.⁴⁵ Also, individuals who scored higher on measures of antisocial personality disorder were more likely to engage in binge drinking.⁴⁶

Other studies report that motivations for drinking and attitudes toward drinking can influence the likelihood of binge drinking. Drinking to cope with negative affect and drinking to fit in with peers have both been associated with binge drinking.⁴⁵ Sex-seeking as a motivation for drinking has been associated with binge drinking among college men.⁴⁵ Individuals who reported drinking alcohol for the purpose of getting drunk were also more likely to engage in binge drinking.⁴² Positive attitudes toward drinking have also been associated with an increased likelihood of binge drinking among college students.³⁹

Problem behaviors and other substance use also have been associated with binge drinking. For example, one longitudinal study found that, across ages 18 to 31, heavy drinkers were more likely to exhibit problem behavior.⁴¹ A longitudinal examination of trajectories of binge drinking found that adolescents who reported using drugs and scored low on measures of depression were more likely to engage

in binge drinking at an earlier age during young adulthood.⁴⁶

In conclusion, several consistent risk factors for binge drinking have been identified, including early onset of alcohol use, being male, identifying as White, having low self-efficacy, scoring high on disinhibition, scoring high on neuroticism-anxiety (for women), being impulsive and sensation-seeking (especially for men), having higher scores on antisocial personality disorder measures, using alcohol to cope or fit in with others, using alcohol for sex-seeking purposes, drinking to get drunk, exhibiting problem behavior, scoring low on depression, and engaging in other substance use.

Risky contexts and events. Specific events and contexts that promote heavy drinking are additional factors that contribute to high rates of binge drinking. Such events include New Year's Eve, St. Patrick's Day, and Halloween.^{47,48} Some high-risk drinking events tend to be more prevalent in young adulthood. For example, homecoming, athletic events, weddings, and graduations are all relatively common events for people in this age range and have been associated with heavy drinking.^{49,50} In addition, 21st birthdays,⁵¹ spring break,⁴⁸ football tailgating,⁵² pregame partying,⁵³⁻⁵⁵ and drinking games^{56,57} have all been associated with excessive drinking among college students. For undergraduates, weekends and the beginning of a semester have been associated with higher levels of drinking.^{47,49}

Social influences, often from close relationships, can contribute to increased risk of binge drinking among college students. For example, having parents who are alcoholics, having friends who drink, and participating in Greek life have all been associated with a greater likelihood of binge drinking.^{46,58-60} Also, peer drinking and use of cigarettes and marijuana have been associated with an increased likelihood of binge drinking.⁶¹

Person-level protective factors. Several protective factors associated with a lower likelihood of engaging in

binge drinking have been identified. Gender is one of these factors. Females tend to drink less than males.⁶² Also, females and individuals with higher grade point averages tend to use more protective behavioral strategies, such as alternating drinking alcohol and water.⁶³ Protective behavioral strategies have been shown to reduce the likelihood of experiencing negative alcohol-related consequences.^{62,64}

Protective contexts and events. Certain cultural climates that promote a normative perception of disapproval toward excessive drinking can protect their adherents against binge drinking. For example, parental disapproval of alcohol use protects against binge drinking.^{59,61} Many religions disapprove of drinking heavily and promote drinking only in moderation or ban drinking among members altogether. As such, religion can exert a protective influence on college student binge drinking.^{61,65} Neighborhood norms against heavy drinking have also been found to protect against binge drinking.⁶⁶

College environments tend to encourage heavy drinking; however, some contextual factors surrounding students can protect against binge drinking and negative alcohol-related consequences. Drinking in college is often a social activity among friends. Close friends who encourage safe drinking can help protect against the negative consequences of excessive drinking.⁶⁷ College drinking that occurs in locations that provide food and water or that accompanies a meal has been shown to reduce negative alcohol consequences.⁶⁸ Additionally, drinking that occurs in bars is somewhat regulated, because bartenders can stop serving individuals who appear drunk.⁶⁹ These specific college drinking contexts allow for use of protective behavioral strategies, such as eating food, drinking water, limiting the number of drinks consumed, and drinking with close friends.⁶²

Other factors specific to certain colleges have been associated with lower rates of binge drinking. For instance,

college students who attended schools with higher social capital (defined as the average time students spent volunteering) were less likely to engage in binge drinking.⁷⁰ Furthermore, research has suggested that attending commuter schools, all-female colleges, and Protestant religious colleges is associated with lower rates of binge drinking.³⁹

Certain social roles and their inherent responsibilities can lead to lower likelihood of binge drinking. For example, studies have found that cohabitation, getting married, and having children all protect against heavy drinking.⁷¹⁻⁷⁵

Alcohol-related laws and policies and their connections to the likelihood of binge drinking have been examined. Plunk, Cavazos-Rehg, Bierut, and Grucza found that more permissive laws regarding the minimum legal drinking age were associated with more binge drinking.⁷⁶ Using MTF data collected from 1976 to 2011 from high school seniors who were followed up to age 26, Jager, Keyes, and Schulenberg found that laws dictating the minimum legal drinking age were associated with decreases in binge drinking for 18-year-olds, but those laws were associated with increases in binge drinking rates across all male participants ages 18 to 22.⁴⁰ Another study found that lower age requirements for purchasing and consuming alcohol were associated with more hazardous and problematic drinking. These findings have clear implications for alcohol policy.⁷⁶

Another study investigated whether personal endorsement of alcohol policies was associated with college student drinking. The authors found that college students who personally endorsed the alcohol laws and policies were significantly less likely to binge drink.⁷⁷ Thus, laws that set a minimum drinking age or a low BAC level for drivers, and personal endorsements of college alcohol policies, can serve as protective contextual factors against college student binge drinking.

Consequences of Binge Drinking

Overall, binge drinking and frequent binge drinking have been consistently, significantly, and positively associated with alcohol-related problems.^{78,79} These problems impact multiple aspects of life for young adults and the people around them and include physical, legal, emotional, social, and cognitive consequences, as well as an increased likelihood of having an alcohol use disorder.

Physical and legal outcomes. Binge drinking is associated with significant increased risk for experiencing consequences, including physical harm, legal problems, and failure to meet role obligations (e.g., work responsibilities). Active-duty military personnel who binge drink are about five times as likely to report drinking and driving or riding with someone who has been drinking.³⁸ College students who binge drank in the previous year were more than twice as likely to be taken advantage of sexually or have unplanned sex, and they were four times as likely to be physically injured.⁸⁰ Additionally, individuals who engaged in frequent binge drinking reported experiencing more sick days and having poorer overall physical and mental health than non-binge drinkers.⁸¹ Binge drinkers also reported having greater sleep problems, including having more trouble falling asleep and staying asleep than those who did not binge drink.⁸² Binge drinking also increases an individual's likelihood of driving after drinking.^{80,83}

Emotional and social outcomes. Binge drinking has been associated with a variety of negative emotional and social outcomes. For example, binge drinkers tended to score higher on measures of depression and anxiety⁸⁴⁻⁸⁶ and reported lower positive mood than nondrinkers.^{86,87} Furthermore, students who binge drank in the previous year were more than twice as likely to report having serious thoughts of suicide.⁸⁰ Another study reported that feelings of remorse after drinking were more common fol-

lowing a binge drinking episode than a nonbinge episode.¹ Few longitudinal studies have examined associations between emotions and binge drinking; however, frequent binge drinking in young adulthood has been found to increase risk for depression 5 years later.⁸⁸

Social outcomes related to binge drinking often involve negative interpersonal interactions and failure to meet relational obligations. When compared to infrequent and non-binge drinkers, frequent binge drinkers are twice as likely to experience interpersonal consequences, including arguing with friends,¹ experiencing strain on relationships,⁸⁹ and getting into physical fights.³⁸ Binge drinkers in college were two to three times as likely to miss class and twice as likely to perform poorly or get behind on schoolwork.^{1,80} Among active-duty military personnel, frequent binge drinking was associated with failure to be promoted and substandard work performance.³⁸

Cognitive outcomes. Binge drinking results in high concentrations of alcohol entering the bloodstream quickly, which can affect cognitive processing. One of the most prevalent cognitive effects of binge drinking is blacking out, a failure to encode memories. Frequent binge drinkers are twice as likely as infrequent binge drinkers to experience blackouts.¹ Several studies reported that the consumption of alcohol at binge levels was associated with poor performance on cognitive tasks, such as recall, spatial recognition, search, and planning tasks.^{86,90-92} Also, gender differences in cognitive function have been noted, with women being more susceptible to the negative cognitive effects of binge drinking.^{87,93}

Research suggests that binge drinking affects the amygdala and prefrontal cortex, and that repeated binge drinking can damage these brain structures.⁹⁴ One study reported that extreme binge drinkers (those who consumed 10 or more drinks per occasion) displayed electroencephalography

(EEG) spectral patterns similar to the patterns displayed in individuals with alcohol use disorder, suggesting that extreme binge drinking can alter the brain negatively and permanently.⁹⁵ Examination of the effects of binge drinking on cognitive structures and on performance in young adults continues to expand as more psychological research incorporates cognitive and neurological testing.

Alcohol use and abuse disorders. In addition to the negative consequences of binge drinking, frequent binge drinking is associated with increased likelihood of consuming alcohol at twice (8+/10+ drinks for women/men) or even three (12+/15+ drinks for women/men) times binge drinking levels.⁹⁶ These high-intensity levels of drinking likely intensify the risk of experiencing negative alcohol-related consequences.

Young adults who binge drink have alcohol use disorder scores that are double the scores of those who do not meet binge drinking criteria.⁹⁷ Also, binge drinkers report consuming twice the alcohol per week and spending a third more time drinking than non-binge drinkers.⁹⁷ Both occasional and frequent binge drinking are associated with a significantly greater risk of abusing alcohol and becoming dependent than non-binge drinkers or abstainers.^{80,85,98} Rates of alcohol abuse and dependence in college student binge drinkers have been reported to be between 14% and 24%.⁹⁹ Furthermore, alcohol withdrawal symptoms have been reported by 15% to 29% of students.⁹⁹

Conclusion

Research on binge drinking in college-age samples suggests that binge drinking rates have decreased over time. Despite this trend, rates still remain high, with 30% to 40% of young adults reporting binge drinking at least once in the previous month. Developmentally and socially, this age range is at higher risk for

consuming alcohol at binge levels. This review summarized individual and environmental factors associated with increased or decreased risk for binge drinking. Understanding these factors is important in guiding future prevention and intervention efforts and in shaping alcohol policies. Targeting prevention and intervention efforts toward young adults during their college years may increase the effectiveness of those efforts, reducing the negative consequences of alcohol use and averting problematic trajectories.

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