According to the researchers, the survey findings offer important insights into the experiences college students are having with alcohol - the most popular drug on American college campuses.

Nearly three-fourths of all respondents (74.2 percent) reported consuming alcohol in the two-week period prior to the survey. Of those, nearly one in 10 (9.4 percent) had experienced at least one blackout during that same time period, while 40 percent reported having experienced at least one during the previous year.

"This study shows that the common assumption that blackouts only happen to alcoholics is wrong," said Aaron White, Ph.D., assistant research professor of psychiatry at Duke and lead author of the study. "It is very possible for social drinkers, such as the students we surveyed, to experience blackouts if they overdo their consumption of alcohol. The study suggests that college students are much more familiar with blackouts than many people, including us, assumed."

**Frequency of Blackouts**

Using an e-mail survey, the researchers collected data from 772 undergraduate college students at Duke University during the spring 2001 semester. The student group surveyed was evenly divided among freshmen, sophomores, juniors and seniors, and between males and females. All students included in the survey were aged 18 years or older.

The survey was a 19-point questionnaire designed to acquire information on demographics, drinking habits, family history of problems with alcohol, frequency of blackouts and the types of events the students later learned they had participated in during the blackout episode.

The researchers acknowledge that while they are pleased with the survey response and sample size, they only examined students from one university. While they expect that the sample of Duke students is likely representative of a broad cross-section of American college students, they stress that larger studies need to be completed before statements can be made about blackouts among college students as a whole.

During a blackout, an individual is capable of participating in salient, emotionally charged events but will have no recollection of what has occurred. Many students in the study indicated that they later learned they had engaged in a wide range of risky activities during their blackout - such as having unprotected sexual intercourse, vandalizing property or driving a car - which could have led to serious health or legal consequences.

**Hazardous Choices**

White stressed that due to the high level of intoxication needed to experience a blackout, other psychological processes may also be impaired.

Impairments in judgment, decision-making, and impulse control could lead an individual to make potentially hazardous choices during blackouts. The researchers believe that more information about why blackouts occur and the potential dangers associated with them need to be part of any standard alcohol-awareness training for students. Such training, they said, would be most effective if made available as early as possible upon a student's arrival on campus.
"We want to provide students with information that will help them make good, informed decisions regarding their use of alcohol," said White. "It is important for students to know what blackouts are and what factors seem to increase the risk of blackout occurrence so that they can be avoided."

The total number of blackouts experienced by students appears to correlate with lower grade point averages and other indicators of problem drinking, the researchers said. Additionally, they learned that while female students tend to drink less heavily than their male counterparts, they were just as likely as males to experience blackouts - and that, they say, could put females at greater risk for a variety of consequences.

**Alcohol Disrupts Information Processing**

Alcohol disrupts information processing in a variety of brain regions, including the hippocampus, which plays a critical role in the formation of memories of facts and events. The researchers suspect that consuming large amounts of alcohol quickly might increase the chances for a blackout because it leads to a rapid increase in the person's blood alcohol content.

This catches the brain circuitry underlying memory formation unprepared to deal with an onslaught of alcohol.

When blood alcohol levels rise slowly, people seem to be less likely to experience blackouts even if they eventually become intoxicated. The researchers speculate that this might be due to a small degree of tolerance that develops during consumption of alcohol and could help protect the brain from blackouts.

"In college, in general, young people are living independently for the first time in their lives," said H. Scott Swartzwelder, Ph.D., clinical professor of psychiatry at Duke, a senior research career scientist with the U.S. Department of Veterans Affairs and a study co-author.

"With new freedoms, many adolescents go into an experimental mode which could include experimenting with alcohol and heavy drinking. Alcohol consumption is often viewed as a rite of passage for young adults and has become widely accepted throughout American culture, but people should be aware that the culture of drinking is quite different than it was some years ago. Many students today drink specifically to get drunk. This increases the risk of all sorts of consequences, including blackouts."

**Long-Term Consequences**

According to the researchers, e-mail surveys have become more popular in recent years as a method of researching the habits and behaviors of college students because computers and e-mail have become mainstream tools for all college campuses. Students are comfortable using both computers and e-mail as a form of written communication, and e-mail surveys offer anonymity and a quick way to respond, they said.

"These study findings are very important because they support a large literature suggesting that students are consuming large quantities of alcohol and that they will suffer consequences," said Fulton T. Crews, Ph.D., director of the Center for Alcohol Studies at the University of North Carolina, Chapel Hill.

"Brain damage incurred during adolescence may become significant later in life as the processes of aging reduce the reserve capacity of individuals," he said. "Degenerative problems may become more prominent as people get older. So the risks of these types of episodes are not only the risks of trauma and harm during the blackout, but could include long-term consequences to health later in life."