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## Identifying Factors That Increase the Likelihood for Alcohol-Induced Blackouts in the Prepartying Context

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### Abstract

The present study examined risk factors related to “blacking out” (e.g., temporary periods of memory loss during drinking) during preparty drinking events (i.e., pregaming, predrinking). Participants were students from two universities on the West Coast who reported past month prepartying ( $N = 2,546$ ) in online surveys administered in the fall of 2008. Among these students, 25% ( $n = 636$ ) reported blacking out during at least one occasion in which they prepartied in the past month. A logistic regression model underscored that Greek student affiliation, family history of alcohol abuse, frequency of prepartying, and both playing drinking games and consuming shots of liquor while prepartying increased the likelihood of blacking out. Limitations and implications for future research and collegiate prevention strategies are discussed.

### Keywords

alcohol; prepartying; pregaming; alcohol-induced; blackout; college students

## INTRODUCTION

College students remain an at-risk population for heavy alcohol use and resulting consequences including emotional, academic, physical, sexual, and legal problems (Hingson, Zha, & Weitzman, 2009; Muraven, Collins, Morsheimer, Shiffman, & Paty, 2005; Wechsler & Nelson, 2006). “Blackout” or “blacking out” refers to a period of time during a drinking event in which an individual cannot recall all or parts of the event. These alcohol-induced memory blackouts, also known as anterograde amnesia or acute alcohol-induced memory dysfunction, may be particularly hazardous. During alcohol-induced blackouts, the hippocampus, a region of the brain fundamental to memory function, is impaired, subsequently causing cognitive deficiencies in transferring information from short-term to long-term memory (Goodwin, 1995; White, 2003). In a blackout situation, individuals suffer

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### Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

partial (i.e., fragmentary blackout) or complete (i.e., en bloc blackout) memory loss for drinking events for which they were conscious and active. In addition to potential neurocognitive impairment, which is especially problematic in younger populations still in the midst of progressive neurodevelopment (Acheson, Stein, & Swartzwelder, 1998; DeBellis et al., 2002; Zeigler et al., 2005), alcohol-induced blackouts also amplify proximal risk (e.g., unsafe sexual behavior, driving while intoxicated, and violence).

### Alcohol-Induced Blackouts

In college-based studies, students experiencing alcohol-induced blackouts have been found to exhibit peak blood alcohol concentrations (BACs) of 0.21 to 0.35 and consume between 8.2 and 11.5 drinks for males and 3.7 and 5.0 drinks for females (Buelow & Koeppe, 2001; Hartzler & Fromme, 2003; Hunt, 1993). In a study of more than 14,000 students from 119 colleges, 10% of nonbinge drinkers (the authors used the term “binge” to refer to heavy episodic drinking events—5 or more drinks in a row for men or 4 or more drinks in a row for women), 27% of occasional binge drinkers (1–2 times in past 2 weeks), and 54% of frequent binge drinkers (3 or more times in past 2 weeks) reporting having blacked out during the current school year (Wechsler, Lee, Kuo, & Lee, 2000). Although the link between “heavy drinking” and blacking out is well known, the direct causes of blacking out are fast-paced alcohol consumption and rapid elevation of BACs, which when combined are speculated to overwhelm sensorimotor processes (Goodwin, Othmer, & Halikas, 1970; Ryback, 1970; White, Jamieson-Drake, & Swartzwelder, 2002; White, Signer, Kraus, & Swartzwelder, 2004). Whether due to alcohol naivety, underage drinking, the desire to obtain a “buzz” before going out, or other factors such as playing consumption-focused games with others, alcohol use in college often takes place away from authority figures and/or legal drinking environments, which may lend itself to quick-paced drinking practices. Therefore, it is not entirely surprising that blackouts are prevalent in college populations. Other studies report that half of college student drinkers have experienced at least one alcohol blackout in their lifetimes, 40% have blacked out in the past year, and 9.4% of those who drank in the past 2 weeks have reported blacking out during the same period (Buelow, 1990; Hartzler & Fromme, 2003; White et al., 2002). Because individuals suffering blackouts most often rely on others to cue or recount such events, assessing blackout-associated risk is challenging. Nevertheless, adverse behavioral consequences include vandalism, unsafe sex, drug use, driving under the influence, and fighting, as well as stressful psychological consequences such as intrusive thoughts or sleep difficulties (Buelow & Koeppe, 2001; White et al., 2002, 2004). In a sample of 50 undergraduate students who reported a blackout and only later became aware of consequences, 50% of males and 38% of females realized they had engaged in sexual activity with individuals they did not know, 38% of males and females had an argument or fight, 25% of males had vandalized property, and 12.5% of males had driven a motor vehicle (White et al., 2004).

### Prepartying Behavior in the College Context

Because blackouts most often result from quickly rising blood alcohol levels resulting from fast-paced drinking, it is important to examine the type of drinking behaviors that can lead to these dangerous states. Prepartying is a high-risk drinking behavior common among college students that is receiving growing attention in the research literature. Also referred to as

“pregaming,” “preloading,” “front-loading,” “predrinking,” or “prefunking” (drinking before a function), depending on the region or local group vernacular, prepartying involves “the consumption of alcohol prior to attending an event or activity (e.g., party, bar, concert) at which more alcohol may or may not be consumed” (Pedersen & LaBrie, 2007, p. 238). Prepartying typically involves fast-paced drinking within brief periods of time, as an inherent purpose is to create a “buzz” or level of inebriation that will heighten enjoyment of the event and possibly endure through the event or until more alcohol can be obtained. This style of drinking makes self-regulation appreciably more difficult and negative consequences more likely. Prepartying has been found to predict numerous consequences among college students such as academic neglect, hangovers, passing out, and fighting (Pedersen & LaBrie, 2007; Pedersen, LaBrie, & Kilmer, 2009).

In three separate studies, researchers estimated that participants reached blood alcohol levels near or above the legal intoxication limit (0.08) during actual prepartying drinking events (LaBrie & Pedersen, 2008; Pedersen & LaBrie, 2007; Pedersen et al., 2009). For the majority of participants, this blood alcohol level was achieved prior to going out and consuming even more alcohol. In event-level studies, 80% of preparty drinking events involved further drinking (Pedersen & LaBrie, 2007), and when including drinks consumed during and after prepartying, students achieved mean blood alcohol levels of 0.15 on prepartying days (LaBrie & Pedersen, 2008). This elevated level of intoxication is immensely risk enhancing, significantly impairing motor control, vision, and decision-making. Thus, prepartying may be especially linked to blackouts. Understanding the link between prepartying and blacking out among college students will prove helpful both to researchers who seek to understand college student drinking and practitioners seeking to design and implement interventions that reduce the risk associated with both of these events.

### Study Aims and Hypotheses

The present study examined a large representative sample of students reporting prepartying behavior to determine how common blacking out was during prepartying events and whether differences emerged between those who experienced preparty-related blackouts and those who did not. For this purpose, the primary analysis entailed a binary logistic regression model of demographic characteristics (age, gender, race, Greek status, family history of alcohol abuse), prepartying frequency, method of prepartying (alone, with friends/roommates, while playing drinking games), and type of alcoholic beverage consumed during prepartying (shots, wine, and mixed drinks) as potential predictors that increased the likelihood of a blackout. Specifically, it was anticipated that blacking out would be fairly common among prepartying college students and that risk factors such as prepartying frequency, playing drinking games while prepartying, and drinking shots of liquor would greatly contribute to blacking out.

## METHOD

### Participants

Recruitment and data collection occurred at two West Coast campuses, one a large public university and the other a private mid-sized university, in 2008. The study was approved by

the Human Subjects Review Boards at both participating universities. Data were collected as part of a larger longitudinal intervention study, and all data used in analyses were derived from the screening survey that was completed before administration of any intervention. Of the 11,069 students invited to participate in the study, 4,984 (45.0%) completed the initial survey. Only those 2,546 (51.1%) participants who answered with a value of at least 1 to the open-ended question, “In the last 30 days, how many days did you engage in prepartying?” received further preparty questions and were therefore included in the final analyses. Demographic characteristics of this prepartying sample revealed that they were primarily female (58.6%) and Caucasian (57.1%). Other ethnic and racial representations were as follows: 20.2% Asian American, 11.0% Hispanic, 2.1% African American, and 9.6% other/multiracial. Review of demographic information from the registrar’s office at both universities revealed that the percentages of women and Caucasians represented in the sample were comparable with the overall compositions of the general student populations. Minor discrepancies in the representativeness of ethnic minorities were present for each institution.

### Design and Procedure

At the end of the first month of the fall term, students were randomly selected from registrar rosters for recruitment. Students received both an email and a postal delivered invitation to participate in a study regarding alcohol use. If the student chose to participate, he/she clicked on a link to the online survey, entered a unique Personal Identification Number (PIN) and was prompted to electronically consent to the study before being directed to the 20-minute screening survey itself. Each student received a nominal stipend of \$15 to complete the survey. The survey assessed demographic variables, as well as several variables related to alcohol use. Prior to questions assessing drinking behavior, one standard drink was defined for students as one-half ounce (oz) of ethyl alcohol, one 12 oz beer, one 4 oz glass of wine, or one 1.25 oz. shot. Pictures of standard drinks accompanied these descriptions.

### Measures

**Demographics**—Background characteristics measured included age, gender, and race. Also assessed were Greek status (“Are you a member of a fraternity or sorority?”) and family history of alcohol abuse<sup>1</sup> (“To your knowledge, do you have any biological relatives that have a significant drinking problem—one that should or did lead to treatment?”).

**Prepartying Behavior**—Prior to questions assessing prepartying, the behavior was defined as “the consumption of alcohol prior to attending an event or activity [e.g., party, bar, concert] at which more alcohol may or may not be consumed” (Pedersen & LaBrie, 2007, p. 238). Participants first responded to the following open-ended question: “In the last 30 days, how many days did you engage in prepartying?” When participants indicated at least one prepartying day, they were then asked, “On average, how many drinks did you consume while prepartying (not including drinks consumed after arriving to your planned

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<sup>1</sup>The journal’s style utilizes the category *substance abuse* as a diagnostic category. Substances are used or misused; living organisms are and can be *abused*. Editor’s note.

destination)?” This was followed by the question, “How did you typically preparty?” Respondents were asked to check all that apply: (1) “Alone, while getting ready to go out” (prepartying alone); (2) “With friends/roommates, while getting ready to go out” (prepartying with friends/roommates); and (3) “Playing drinking games” (prepartying while playing drinking games). The next question assessed type of alcoholic beverage consumed while prepartying: “What did you typically drink while prepartying?” Again, respondents were asked to check all that apply: (1) “beer”; (2) “shots”; (3) “wine”; and (4) “mixed drinks.” Finally, participants reported on the following question representing the dependent variable of interest: “How many times in the past month (30 days) did you blackout on a night when you prepartied? If this never happened to you, please leave the question blank or type ‘0’.” This item was on an open-ended response scale and indicated the number of times the participant experienced a blackout during or after a prepartying event.

**Typical Alcohol Use Behavior**—Quantity of alcohol consumption was assessed using the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). Participants were asked, “Consider a typical week in the last month. How much alcohol, on average (measured in number of drinks), did you drink on each day of a typical week?” Participants responded by reporting the typical number of drinks consumed on each day of the week. Weekly drinking was calculated by summing participants’ responses for each day of the week. The DDQ has been used in previous studies of college student drinking and has demonstrated good validity (Larimer et al., 2001; Marlatt et al., 1998).

## RESULTS

### Data Analysis

The dependent variable assessed the number of times in the past 30 days participants blacked out on a night when they engaged in prepartying. Owing to some respondents reporting extremely high values, this open-ended response variable displayed highly non-normal distributional properties (skewness = 8.00,  $p < .001$ ; kurtosis = 137.80,  $p < .001$ ). Thus, it was necessary to binary code the outcome into whether a respondent experienced a blacked out at least once (1) or never (0). For the purpose of interpretation in a logistic regression model, the predictor variables of respondent age and prepartying days in the past 30 days each were recoded and analyzed as discrete categorical variables (see Table 1 for categories), enabling the comparison levels of a variable to be contrasted to its respective reference level (Norusis, 2003).

Initial data analyses examined information with regard to number of prepartying days, prepartying drinks, typical alcohol use behavior, whether participants blacked out, and gender differences. Next, chi-square tests determined significant bivariate relationships between each of the 13 categorical variables (see Table 1 for variables) and whether respondents had experienced a blackout on a prepartying night in the past 30 days. Finally, a more comprehensive analysis collectively incorporated all variables into a binary logistic regression model predicting the experience of having a blackout on a prepartying night. Results from this analysis would yield valuable insight into the most important risk factors contributing to whether respondents experienced a black out, after statistically controlling

for, and therefore ruling out, all other covariates in the model. The binary logistic regression model was specified and estimated according to established procedures (Tabachnick & Fidell, 2007). The parameter of interest assessing the contribution of each predictor in this statistical technique is the odds ratio (OR). A null hypothesis OR of 1.0 represents no difference in ratio of proportion of blacking out (vs. not blacking out) between a specific comparison level (e.g., Asian, Hispanic, African American, and other/multiracial) and its corresponding reference level (e.g., Caucasian). The OR also serves as an indicator of effect size (Lipsey & Wilson, 2001).

### Initial Analyses

Participants reported the following number of days they prepartied in the past 30 days: 1 (19.2%), 2–5 (52.1%), 6–9 (17.9%), and 10+(10.8%). Among male participants, the number of prepartying days reported were 1 (16.4%), 2–5 (50.0%), 6–9 (20.2%), and 10+ (13.4%). Among female participants, the number of prepartying days reported were 1 (21.1%), 2–5 (53.6%), 6–9 (16.2%), and 10+ (9.0%). A 2 (gender)  $\times$  4 (prepartying days categories) analysis of variance (ANOVA) was performed on the dependent variable of average number of drinks consumed during a typical preparty occasion. Results revealed a main effect for both gender,  $F(1, 2,538) = 186.74, p < .001$ , and prepartying days categories,  $F(3, 2,538) = 136.45, p < .001$ , in addition to their interaction effect,  $F(3, 2,538) = 8.39, p < .001$ . Representation of the interaction effect in Figure 1 shows that males averaged more beverages during a typical prepartying occasion than females, and that this gender discrepancy became especially pronounced as the number of prepartying days increased.

Descriptive data also indicated that 25.0% ( $n = 636$ ) of this prepartying sample of respondents experienced a blackout in the past 30 days on a night when they prepartied, with 14.2% ( $n = 361$ ) blacking out once, 5.7% ( $n = 145$ ) blacking out twice, and 5.1% ( $n = 130$ ) blacking out three or more times. In terms of total drinks per week from the DDQ, males who experienced a blackout consumed 23.14 (standard deviation [ $SD$ ] = 13.03) drinks per week compared with 11.85 ( $SD = .95$ ) drinks per week among males not reporting a blackout,  $t(1,052) = 15.41, p < .001$ . Females reporting a blackout consumed an average of 12.77 ( $SD = 7.76$ ) total drinks per week in contrast to 6.91 ( $SD = 5.88$ ) drinks among females not reporting a blackout,  $t(1,492) = 14.99, p < .001$ .

Furthermore, we examined the average number of prepartying drinks consumed during a typical prepartying event (not including drinks consumed after prepartying). Among the overall sample, 34.9% of males and 29.4% of females reported engaging in heavy episodic drinking during a typical prepartying event (consuming 4+ drinks for women and 5+ drinks for men in a row; O'Malley & Johnston, 2002; Wechsler & Nelson, 2008). Specifically, among those who reported blacking out, 56.0% of males and 49.7% of females engaged in heavy episodic drinking during a typical prepartying event. However, among those not reporting a blackout, only 26.6% of males and 23.2% of females engaged in heavy episodic drinking during a typical prepartying event. In addition, males who reported blacking out consumed an average of 4.96 ( $SD = 2.02$ ) drinks during a typical prepartying event, compared with 3.67 ( $SD = 2.02$ ) drinks for males who did not report blacking out,  $t(1,056) = 9.29, p < .001$ . Females who experienced a blackout averaged 3.66 ( $SD = 1.42$ ) drinks

during a typical prepartying event, in comparison with 2.70 ( $SD=1.48$ ) drinks for females not experiencing a blackout,  $t(1,493) = 10.76, p < .001$ .

### Variables Bivariately Associated With Blacking Out

Results of the chi-square tests of independence between each variable and blacking out are displayed in Table 1. Ten of the 13 variables were evidenced to be bivariately associated with blacking out. Respondents who blacked out, in comparison to those who did not, tended to be male, Caucasian, Greek-affiliated, and possessed a family history of alcohol misuse. In addition to these demographic factors, the cohort experiencing the blackout tended to engage in more days of prepartying, preparty while playing drinking games, as well as be more likely to consume beer, shots, wine, or mixed drinks during prepartying events. Age, prepartying alone, and prepartying with friends/roommates did not emerge as factors associated with blacking out.

### Predictive Model

Results from the binary logistic regression model predicting blacking out are presented in Table 2 and interpreted after statistically controlling for the variance explicated by all other predictors entered into the model. The overall logistic regression model, with all predictors entered, emerged as highly significant, Nagelkerke  $R^2 = 23.7\%$ ,  $\chi^2(18) = 442.83, p < .001$ . Specifically, Asian ( $OR = 0.73, p < .05$ ) and African American ( $OR = 0.43, p < .05$ ) students tended to be less likely to blackout than their Caucasian peers. Greek status ( $OR = 1.37, p < .01$ ) and family history of alcohol misuse ( $1.24, p < .05$ ) also served as significant predictors of blacking out. In contrast to respondents engaging in only 1 day of prepartying in the past 30 days, respondents prepartying 2–5 days ( $OR = 6.36, p < .001$ ), 6–9 days ( $OR = 14.73, p < .001$ ), and 10 or more days ( $OR = 27.01, p < .001$ ) experienced elevated, and extremely high, rates of suffering a blackout. Increased risk of experiencing a blackout was also predicted by prepartying while playing drinking games ( $OR = 1.26, p < .05$ ) and prepartying while consuming shots ( $OR = 1.60, p < .001$ ).

## DISCUSSION

The current study assessed the prevalence of past month prepartying behavior and particularly the concomitant risk of blacking out during a prepartying event in a large sample of college students. The study further evaluated potential characteristics associated with those who did or did not experience a blackout on a prepartying night in the past month and the factors that contributed to the likelihood of a prepartying event resulting in a blackout. Findings indicated that both prepartying and blacking out when prepartying were common, with over half of the participants reporting prepartying during the past month and, among these, one fourth reporting blacking out during a prepartying event. Those who blacked out drank at higher levels during prepartying than those who did not blackout. Although typical hours spent consuming beverages was not assessed, previous research looking at multiple prepartying events revealed that approximately 50% of students' prepartying events lasted less than 1 hour, with approximately 90% lasting less than 2 hours (Pedersen & LaBrie, 2007). This is consistent with research documenting the relationship between blackouts and a rapid rate of alcohol consumption (White et al., 2002). Descriptive



data on the current sample revealed that compared with prepartiers who did not report blacking out during the past month, male and female students who did report a blackout drank approximately twice as much during a typical week and consumed more drinks during a typical prepartying occasion. Further, approximately 56% of males and 50% of females who had experienced a blackout while prepartying engaged in heavy episodic drinking during a typical prepartying event compared with only 27% of males and 23% of females who did not experience a blackout. Although the actual duration of drinking events and subsequent timing of the ensuing blackout was not directly assessed in this study, fast-paced drinking during prepartying (Pedersen&LaBrie, 2007) is likely associated with reductions in judgment and minimization of potential consequences (Fromme, Katz, & D'Amico, 1997), whereby leading to heavier drinking following the prepartying event later in the night. Indeed, the amount of alcohol consumed during prepartying directly predicts the amount consumed afterwards (Pedersen & LaBrie, 2007). These links further categorize prepartying as a risky behavior with the potential for quickly elevated BACs leading to blacking out and potentially dangerous negative consequences associated with blacking out.

Chi-square tests revealed bivariate relationships between blacking out and the following factors: being male, being Caucasian, Greek status, family history of alcohol abuse, prepartying more frequently, prepartying while playing drinking games, and, not surprisingly, consuming larger amounts of alcohol during prepartying, whether it be beer, wine, shots, or mixed drinks. Of notable interest is that age did not play a role in discriminating among students who reported blacking out while prepartying. Although the genesis of prepartying is not known, one possible speculation is that it emerged from underage drinkers (those under the legal drinking age of 21 in the United States) not having access to alcohol once they go out for the evening. For example, underage students may consume alcohol prior to attending a club that requires students be 18 years of age to enter but 21 or older to consume alcohol. In addition, concert venues, sporting arenas and stadiums, or school-sponsored events often are either alcohol free or require that students be of legal drinking age in order to consume alcoholic beverages. This may be why in one study that specifically focused on reasons for prepartying among a young college-aged population, males and females reported arriving to a social event already under the influence as their most highly endorsed reason for prepartying (Pedersen et al., 2009). Yet while prepartying is popular among underage drinkers seeking intoxication whether it be before a school-related function, party, social, or sporting event, it also remains popular among students of legal drinking age. Previous studies have found no differences between underage and of-age participants on the number of drinks consumed while prepartying or the frequency of prepartying in the past month (e.g., Glindemann, Ehrhart, Maynard, & Geller, 2006; Pedersen et al., 2009). Coupled with the current results, it appears that risky drinking behaviors, such as prepartying, may need to be demythologized as a primarily first-year student or underage drinking phenomenon.

Previous research has identified factors such as being Caucasian (Office of Applied Studies, 2008; O'Malley & Johnston, 2002), Greek status (Larimer, Anderson, Baer, & Marlatt, 2000; Park, Sher, & Krull, 2008), possessing a family history of alcohol misuse (Warner, White, & Johnson, 2007), drinking frequently (Borsari, Neal, Collins, & Carey, 2001), and playing drinking games (Borsari et al., 2007) to be associated with risky or problematic

drinking. Thus, for a more comprehensive examination, we incorporated all potential factors into a logistic regression model to determine which factors uniquely accounted for blacking out while prepartying when controlling for the other factors. Similar to previous findings, the likelihood of having had a blackout was uniquely predicted by being in a fraternity or sorority, possessing a family history of alcohol abuse, engaging in prepartying more frequently, playing drinking games while prepartying, and consuming shots of liquor while prepartying.

Identifying prepartying factors that provide unique risk for preparty-related blackouts provides information that can be incorporated into targeted prevention efforts. Prevention and intervention messaging could discuss the dangers of combining drinking games with prepartying, as well as the heightened risk associated with drinking shots of liquor in the context of prepartying. White et al. (2004) also found that students were more likely to blackout on nights in which they were drinking liquor. This is likely due to the quickened drinking and absorption factors typically associated with liquor as opposed to other types of alcoholic beverages such as beer or wine. Furthermore, drinking games have been linked to numerous consequences in college students (e.g., hangovers, campus violations, reliance on alcohol, risky sexual behaviors, and car accidents; Borsari et al., 2007; Pedersen & LaBrie, 2006). Problems may be especially compounded in the context of prepartying, however, given the short duration and the possibility that some students may be unfamiliar with the acute effects of alcohol. Thus, when consuming several shots or engaging in drinking games within the short period of the “preparty,” students may not realize the intoxication levels that will be reached following time-delayed absorption, which may account for the dangerously high prevalence of blacking out.

Further, previous research has found that female students are more likely to consume shots of liquor when prepartying than male students, who typically drink beer when prepartying (Pedersen & LaBrie, 2007). Also, women experienced more alcohol-related consequences on a prepartying day than on a non-prepartying day (LaBrie & Pedersen, 2008). Thus, the current findings showing that drinking shots of liquor when prepartying increases the likelihood of blacking out hold particular relevance for women’s health and well-being. Women absorb alcohol more quickly than men, reaching higher BACs more rapidly and, when blacked out or at risky BACs, are at risk for serious consequences, particularly sexually-related negative consequences. Focusing on prepartying behaviors among women, while providing information on the physiological differences between men and women in processing alcohol, may be particularly effective at reducing risk among female students.

Finally, blacking out has traditionally been linked to dosages commonly referred to as “acute excessive alcohol consumption,” “fast-paced drinking,” “high blood alcohol levels,” or “heavy episodic drinking.” Such descriptions may not resonate with students when promoting prevention or intervention messages. Prepartying (and its regional variations), however, is identifiable as a behavior well established in collegiate nomenclature and that can be quantifiably researched. As a result, prepartying may hold more potential as a target for efficacious experimental manipulation than other, more abstract, concepts of “heavy drinking.”

## Study Limitations and Future Directions

The current study has several limitations. First, this study did not specify or define the type of blackout that was experienced. It is possible that referring to a generic term of “blacking out” may have resulted in students thinking about times they woke up with no memories, also known as en bloc. However, research suggests that fragmentary blackouts are most common among college students (White et al., 2004), and thus participants may actually have underreported the frequency of blackout occurrence while prepartying. Similarly, the wording of the question may have led students to answer as if the blackout referred to the prepartying event itself; however, this is unlikely given that the text read as “... did you blackout *on a night when you prepartied*.” Anecdotal experiences during our work with students suggested that our phrasing of the question was understood to indicate that the blackout could have occurred at any point during the night (i.e., during the prepartying event or after). Second, while the generalizability of the participants within each site was indicated by the representative percentage of female and Caucasian participants, the slightly discrepant percentages of African American, Asian American, and Hispanic American participants may have led to inconclusive findings when comparing Caucasians with these groups. Studies with ample number of minority participants specifically targeting differences in ethnicity-specific prepartying behavior are needed. Third, all measures were self-report and therefore subject to errors in recall. However, this limitation is attenuated by the fact that participants were repeatedly assured of confidentiality and that blacking out is a salient event for most students, meaning that they may be more apt to accurately recall specific characteristics surrounding prepartying events. As length of time typically spent prepartying was not assessed, we were unable to determine if participants generally reached blackout BACs (Buelow & Koeppel, 2001; Hartzler & Fromme, 2003; Hunt, 1993) during prepartying or if prepartying associated with increased risk for further drinking that led to a blackout.

While this study focused on the blackout as the measure of consequence, it would also be interesting to garner a sense of the potential consequences that blacking out may have caused. Future research could include a wider assessment of whether students were able to find out what transpired while they were blacked out and if any physical, psychological, or psychosocial consequence occurred as a result. Circulating such data to other students could aid in creating awareness of psychological stressors that could potentially occur in the aftermath of a blackout, prompting reconsideration of engaging in future “heavy drinking” episodes. Finally, recent research has documented a high (45%) prevalence rate of prepartying during the final months of high school, which was subsequently found to prospectively increase alcohol-related risk upon the transition into college (Kenney, Hummer, & LaBrie, 2010). In light of the current findings, research should continue to focus on high school and noncollege samples to determine whether memory blackouts or other serious consequences are associated with prepartying in drinking environments other than college. Novel and tailored intervention approaches for this risky drinking context are clearly needed and such calls are being increasingly echoed in recent research (e.g., Read, Merrill, & Bytschkow, 2010).

## Summary

Prepartying is a high-risk drinking context that is common in college students and which often leads to blacking out. By examining factors that predispose students to hazardous scenarios, practitioners can potentially make a stronger impact in reducing some of these risks via intervention and prevention efforts. The present study began to address some specific indicators involved in the likelihood of blacking out while prepartying, including drinking shots of liquor, playing drinking games, prepartying frequently, and racial/ethnic identity. Thus, college student affairs personnel are encouraged to remain cognizant of these markers and create novel messaging and programming targeting these risk-inducing factors.

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## Biographies



**Joseph W. LaBrie** obtained a Ph.D. in clinical psychology in 2002 from the University of Southern California, in addition to holding a M.Div. in theology and a M.S. in mathematics. He is currently the Special Assistant to the President, Associate Professor of psychology, and Director of the Heads Up research lab at the Loyola Marymount University. His research interests are focused on prevention and intervention efforts for risky behaviors among young adults and adolescents. Dr. LaBrie has published over 70 research articles in this area as well and been the recipient of numerous private and federal grants to study young adult health behaviors and approaches to prevention and intervention.



**Justin F. Hummer** is the Assistant Director of the Heads Up research lab at the Loyola Marymount University. His primary research interests consider how social and motivational factors relate to the etiology, prevention, and treatment of health-risk behaviors among college students.



**Shannon R. Kenney** graduated from the Brown University in 2006 with a Ph.D. in sociology. She is currently a postdoctoral fellow in the Heads Up research lab and Visiting Assistant Research Professor at the Loyola Marymount University. Her research has focused on youth and adolescent health, including the treatment and prevention of substance misuse and poorer mental health.



**Andrew Lac** is earning his Ph.D. in psychology at the Claremont Graduate University, and serves as a Statistical Consultant at the Loyola Marymount University and the University of Southern California. With interests encompassing social, developmental, and health psychology, his published research applies multivariate methods to examine adolescent delinquency and family dynamics.



**Eric R. Pedersen** is a doctoral candidate in the clinical psychology program at the University of Washington. His interests are in young adult substance use. In particular, he is interested in exploring the contextual factors related to alcohol and marijuana use among college students.

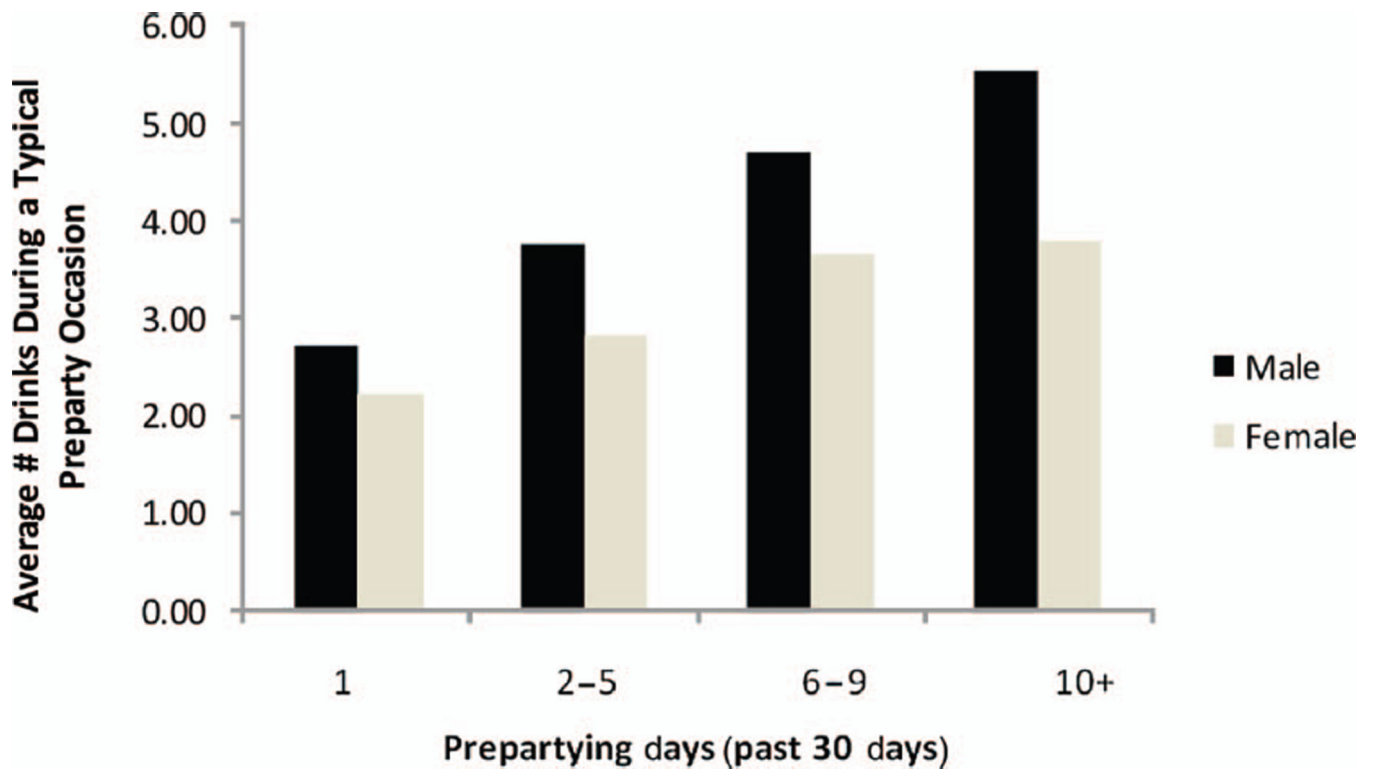
## GLOSSARY

<b>Alcohol-Induced Blackout</b>	Period of time in which memory is impaired by alcohol consumption such that an individual is unable to recall all or parts of a past drinking event (also known as anterograde amnesia or acute alcohol-induced memory dysfunction).
<b>En Bloc Blackout</b>	A blackout in which an individual suffers complete memory loss related to a drinking event, even when provided details.
<b>Fragmentary Blackout</b>	A blackout associated with partial memory loss in which an individual is able to recall some but not all aspects of a drinking event, and is often able to remember details when prompted.
<b>Prepartying</b>	Also referred to as pregaming, preloading, front-loading, predrinking, or prefunking, prepartying involves the consumption of alcohol prior to attending an event or activity (e.g., party, bar, concert) at which more alcohol may or may not be consumed.

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**FIGURE 1.**  
Gender  $\times$  preparty days on average drinks during a typical preparty occasion.



**TABLE 1**

Chi-square tests between each variable and blacking out on a prepartying night

Predictor	Level	Blacked out				Pearson $\chi^2$
		No		Yes		
		%	n	%	n	
Age	Under 21 years	62.8	1,200	63.8	406	0.21
	21+	37.2	710	36.2	230	
Gender	Male	39.9	763	45.8	291	6.63*
	Female	60.1	1,147	54.2	345	
Race	Caucasian	54.6	1,042	64.6	411	31.65***
	Asian	22.4	427	13.8	88	
	Hispanic	10.6	203	11.9	76	
	African American	2.5	47	1.1	7	
	Other/multiracial	10.0	191	8.5	54	
	Greek status					82.96***
Family history of alcohol abuse	No	72.3	1,379	52.8	335	
	Yes	27.7	528	47.2	300	10.46***
Prepartying days (past 30 days)	No	64.4	1,230	57.2	364	
	Yes	35.6	680	42.8	272	
	1	24.7	472	2.5	16	364.21***
	2-5	55.3	1,056	42.6	271	
Prepartying alone	6-9	13.9	266	29.7	189	
	10+	6.1	116	25.2	160	
	No	95.1	1,816	94.0	598	1.08

Predictor	Level	Blacked out				Pearson $\chi^2$
		No		Yes		
		%	n	%	n	
Prepartying with friends/roommates	Yes	4.9	94	6.0	38	0.91
	No	4.7	90	5.7	36	
Prepartying while playing drinking games	Yes	95.3	1,820	94.3	600	89.02***
	No	61.7	1,178	40.3	256	
Prepartying with beer	Yes	38.3	732	59.7	380	26.64***
	No	42.8	818	31.9	203	
Prepartying with shots	Yes	57.2	1,092	68.1	433	43.24***
	No	33.1	632	19.3	123	
Prepartying with wine	Yes	66.9	1,278	80.7	513	8.96**
	No	85.1	1,625	80.0	509	
Prepartying with mixed drinks	Yes	14.9	285	20.0	127	8.36**
	No	44.8	855	38.2	243	
	Yes	55.2	1,055	61.8	393	

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$ .

**TABLE 2**

Binary logistic regression model predicting blacking out on a prepartying night (1 = yes, 0 = no)

Predictor	Level	B	SE	Wald	OR <sup>a</sup>
Age	Under 21 years				1.00
	21+	0.06	0.11	0.30	1.06
Gender	Male				1.00
	Female	-0.07	0.11	0.41	0.93
Race	Caucasian				1.00
	Asian	-0.32	0.15	4.83	0.73*
	Hispanic	-0.05	0.16	0.10	0.95
	African American	-0.85	0.44	3.84	0.43*
	Other/multiracial	-0.21	0.18	1.27	0.81
Greek status	No				1.00
	Yes	0.32	0.11	8.71	1.37**
Family history of alcohol abuse	No				1.00
	Yes	0.21	0.10	4.19	1.24*
Prepartying days (past 30 days)	1				1.00
	2-5	1.85	0.27	48.48	6.36***
	6-9	2.69	0.28	93.26	14.73***
	10+	3.30	0.29	128.01	27.01***
Prepartying alone	No				1.00
	Yes	-0.01	0.22	0.00	0.99
Prepartying with friends/roommates					

Predictor	Level	B	SE	Wald	OR <sup>a</sup>
Prepartying while playing drinking games	No				1.00
	Yes	-0.24	0.24	1.06	0.79
Prepartying with beer	No				1.00
	Yes	0.23	0.11	4.11	1.26*
Prepartying with shots	No				1.00
	Yes	0.08	0.12	0.49	1.09
Prepartying with wine	No				1.00
	Yes	0.47	0.12	14.61	1.60***
Prepartying with mixed drinks	No				1.00
	Yes	0.14	0.14	1.04	1.15
	No				1.00
	Yes	-0.03	0.11	0.06	0.97

Note. The first level of each predictor variable represents the reference level; SE, standard error.

<sup>a</sup> Adjusted odds ratio, after controlling for all other predictors in the model.

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$ .