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Pregaming, Drinking Duration, and Movement as Unique Predictors of Alcohol Use and Cognitions Among Mandated College Students

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Abstract

Background—Pregaming is a common phenomenon among college students and is associated with increased risks such as heavy drinking, alcohol-related consequences, and violating campus alcohol policies. However, the mechanism by which pregaming increases student risk is unclear.

Objectives—The current study aimed to delineate the role of personal endorsement of pregaming, duration of an entire drinking episode on the night of an alcohol violation, and movement from one location to another in predicting alcohol use and violation-related cognitions.

Methods—Participants (N = 113) were college students who had received an alcohol violation. Hierarchical multiple regressions were conducted to investigate the predictive value of pregaming endorsement, duration of drinking, and movement on drinking behaviors [number of drinks consumed and estimated blood alcohol content (eBAC)] on the night of the alcohol violation as well as violation-related cognitions (responsibility, aversiveness).

Results—Pregaming and duration of drinking were significant predictors of alcohol consumption and eBAC on the night of the violation, whereas movement was not. Duration of the drinking episode was significantly related to increased perceived responsibility for the alcohol violation.

Conclusions/importance—Self-reported pregaming and the duration of the drinking episode appear to be better targets than movement for prevention and intervention efforts addressing pregaming on college campuses. Interventions should continue focusing on reducing pregaming and its associated consequences, especially for those who report a longer duration of drinking following a pregaming episode.

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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.

Keywords

Pregaming; duration of drinking; movement; event-related cognitions; mandated college students; alcohol

Excessive alcohol use is exceedingly problematic on college campuses, where almost half of college students report engaging in heavy episodic drinking (HED, defined as five or more drinks in one occasion for males and four or more for females; Substance Abuse and Mental Health Services Administration, , 2012; Snyder & Dillow, 2012) at least once in the past month (Hingson et al., 2009). HED places college students and their peers at risk of extensive harm, ranging from academic and physical problems to legal involvement and accidental death (Perkins, 2002; Hingson et al., 2009). It also increases risk of campus and public policy violations, as alcohol use is restricted or prohibited on a large number of college campuses (Mitchell et al., 2005). Many students who violate these policies (also known as mandated students) are required to complete either public service or receive an alcohol intervention as part of school sanctions (Wechsler et al., 2002).

Pregaming (i.e., prepartying, preloading, or frontloading), or consuming alcohol in anticipation of a subsequent social event, is common among both mandated (Borsari et al., 2007) and nonmandated (Merrill et al., 2013; Read et al., 2010) college students. In contrast with other high-risk drinking behaviors (e.g., drinking games), pregaming appears to be a unique predictor of elevated blood alcohol concentrations (BACs) and alcohol-related problems (Barnett et al., 2013; Borsari et al., 2007), and has been found to increase the likelihood of heavy drinking and related consequences (Borsari et al., 2007; LaBrie & Pedersen, 2008; Read et al., 2010; Zamboanga et al., 2010). Females may be at particular risk, reporting elevated consumption and BACs on pregaming nights compared to nonpregaming nights (LaBrie & Pedersen, 2008).

The precise way in which pregaming is linked to increased alcohol-related risk remains unclear. For example, pregaming may lead to students drinking as much as possible and as quickly as possible before going out (DeJong et al., 2010), in which case pregaming itself would place students at risk for subsequent problems and elevated BACs. Pregaming may also prolong the total amount of time that students spend drinking, as it involves consumption of alcohol prior to attending another drinking event/episode. This increased time spent drinking has been associated with greater amounts of alcohol consumed (Aitken & Jahoda, 1983; Cutler & Storm, 1975; Kessler & Gomberg, 1974). Furthermore, a recent study found that heavier alcohol consumption on pregaming nights was attributable primarily to the amount of time spent drinking, as opposed to factors such as type of drinks consumed and the presence of same-sex friends (Labhart et al., 2014). Finally, pregaming may involve movement from one location to another, with students consuming alcohol and with friends prior to going to another setting such as a bar or party (Wells et al., 2009; Zamboanga et al., 2013). Research indicates that individuals who consume alcohol at multiple locations report increased alcohol consumption, higher BACs, and increased likelihood for aggression, especially as the number of locations increases (Labhart et al., 2014; Wells et al., 2008; Wieczorek et al., 1992). Thus, movement from one drinking

location to another may play a unique role in the relationship between pregaming and increased drinking.

There has been some evidence to suggest college students who pregame are more aware of the association between their heavy drinking and alcohol-related consequences than nonpregamers, in that they take more responsibility for their actions and find alcohol violations more aversive (Borsari et al., 2007). Research has demonstrated that the more aversion or distress an individual feels about an alcohol-related incident (such as a violation on campus), the more motivation to change or reduce drinking they experience (Barnett et al., 2002; Barnett et al., 2003), making pregaming clinically relevant. Similarly, individuals report higher motivation with increased perceptions that the violation is due to their own risky behaviors (Barnett et al., 2002; Barnett et al., 2003; Barnett et al., 2006). Hence, the more aversion and sense of responsibility students assume for an alcohol-related incident, the more discomfort they have and the more ready they may be to address their drinking. Therefore it is valuable to examine what aspects of a salient and motivated behavior such as pregaming (endorsement of pregaming, duration of entire drinking episode, and movement from one location to another) might predict different event-related cognitions, specifically higher levels of distress and perceived personal responsibility.

The current study aimed to add to the existing pregaming literature in two ways. First, we were interested in examining the different aspects of pregaming in predicting drinking quantities and estimated BAC (eBAC) on the night of an alcohol violation. Secondly, because increased distress and perceived responsibility for an alcohol violation are related to more willingness and desire to alter drinking habits, we examined the differential association between these aspects of pregaming and event-related cognitions related to the alcohol violation. Consistent with prior research, we hypothesized that the addition of duration of drinking and movement would significantly predict alcohol use and violation-related cognitions above and beyond self-reported pregaming. Examination of the problematic aspects of pregaming will improve our understanding of this common and high-risk behavior and streamline intervention and prevention efforts related to college alcohol misuse.

Method

Participants

Participants were 113 undergraduate students [66.4% male; 98.1% white; average age = 18.66 (SD = 0.75)], who violated campus alcohol policy at a four-year, private, liberal arts university in the Northeastern United States, and provided data regarding the night of the violation prior to participation in any intervention. Participants completed the assessment battery approximately two to three weeks following the referral incident. The present study is a secondary analysis of data from a randomized clinical trial implementing stepped care brief alcohol intervention with mandated college students (N = 598; See Borsari et al., 2012). All participants provided informed consent, and procedures were approved by the University's Institutional Review Board.

Measures

Pregaming—Pregaming was assessed by asking participants a yes/no question (Borsari et al., 2007): “Did you ‘pregame’ or ‘preparty’ on the night of the referral? This is when you drink before you go out for the night (e.g., in your home/room or a friend’s home/room). This includes drinking while waiting for people to gather for the evening or drinking in order to ‘get buzzed’ before going to a party/function at which alcohol will be expensive (e.g., at a bar or club) or difficult to obtain (e.g., at a school function).” Participants were also asked to estimate the number of times they pregamed in the past month based on the same definition above.

Duration of drinking—Participants were asked to report the time at which they began drinking and the time at which they were cited for the alcohol violation on the night of the referral incident. These times were then used to calculate the length of time spent drinking until the alcohol violation occurred.

Movement—Participants reported the different locations at which they drank on the night of the referral incident. A variable was created that categorized participants into two groups: (a) those who remained in the same place all evening and (b) those who moved to one or more different location(s) at some point during the night. Because the majority of our sample who reported moving throughout the night indicated moving to only one location (70%), we decided to make our movement variable dichotomous rather than continuous.

Alcohol use—Two variables were used to index alcohol use for the primary analyses. First, eBAC was calculated based on participants’ responses to items assessing the number of drinks they consumed prior to the citation event and the amount of time spent drinking during that particular episode. Event eBAC was then calculated using the Matthews & Miller (1979) equation and an average metabolism rate of 0.017 g/dL/h. As a second index of alcohol use, participants reported the number of drinks they typically consume during a typical drinking episode.

Response to referral incident—Previous research with mandated students (Barnett et al., 2006; Barnett et al., 2008) has utilized two scales to assess responsibility and aversiveness. These scales have been adapted from a measure that assesses reactions to alcohol-related injuries in emergency department patients (Longabaugh et al., 1995). The first assesses responsibility for the incident in three items: (a) “To what extent do you believe your alcohol consumption was responsible for this incident?” (b) “To what extent was the incident your own fault?” and (c) “To what extent do you believe your own risk-taking behavior was responsible for this incident?” The second scale utilizes three items to measure aversiveness of the incident: (a) “To what extent has this incident upset you?” (b) “When thinking about this incident, how badly do you feel about it?” and (c) “How unpleasant has this incident been for you?” All items were scored from 1 (not at all) to 7 (extremely or totally). In this study, the responsibility and aversiveness scales demonstrated good internal consistency (Cronbach alphas of 0.73 and 0.87, respectively).

Data analysis plan

First, correlational analyses were used to analyze the associations between the three pregaming variables (personal endorsement of pregaming, duration of the drinking episode, and movement from one location to another). Second, chi-square and t-tests were conducted to examine differences between those who endorsed pregaming and those who did not on demographic, movement, alcohol use, and violation-related cognitions. Finally, hierarchical multiple regressions were conducted to investigate the predictive value of the three pregaming variables in relation to drinking behaviors (number of drinks consumed and eBAC on the night of an alcohol violation) and event-related cognitions (responsibility and averseness). In these models, pregaming was entered into the first step, followed by duration of drinking in the second step, and movement in the third step to examine how these different aspects of pregaming contribute to alcohol consumption and event-related cognitions on the night of a referral incident. A conventional significance level of $p < .05$ was used in all analyses.

Results

Descriptive statistics

The majority of participants (90.6%) reported pregaming at least once in the past month; however, only 35.4% reported pregaming on the night of their alcohol violation. On average, participants reported consuming 6.46 ($SD = 4.84$) drinks on the night of the violation, which did not differ from the reported number of drinks consumed ($M = 6.94$; $SD = 3.36$) during a typical night of drinking. Participants averaged an event eBAC of 0.12 ($SD = 0.09$). Participants reported spending an average of 2.68 h ($SD = 1.70$) drinking on the night of the referral event, with 33.6% of students reporting movement from one location to another at some point during the night. Collectively, participants reported moderate perceptions of personal responsibility ($M = 4.41$, $SD = 1.74$) and aversiveness ($M = 3.48$, $SD = 1.73$) for the alcohol violation. As can be seen in Table 1, students who pregamed the night of the referral incident were more likely to be sophomores, travel from one place to another, drink more drinks over a longer period of time, achieve a higher eBAC during the evening, and perceive the incident as more aversive than students who did not report pregaming on the night of the incident. Pearson's r statistics demonstrated that all of the various aspects of pregaming (self-reported endorsement of pregaming, duration of drinking episode, and movement) were significantly but moderately correlated with one another ($r_{range} = 0.28–0.34$; $p < .05$).

Predicting alcohol use and event-related cognitions

Hierarchical multiple regressions were conducted to determine the unique contributions of pregaming, duration, and movement in the prediction of alcohol use and eBAC (see Table 2). In step one, endorsing pregaming on the night of the violation was a significant predictor of number of drinks consumed on the night of the referral. In step two, duration of the drinking episode was a significant predictor of alcohol consumption, accounting for an additional 9% of the variance in alcohol use ($R^2 = 0.30$). The final step, in which movement was added as a predictor, was not significant and did not account for any additional variance in drinking quantity ($R^2 = 0.30$). Similarly, pregaming was a significant predictor of eBAC in step one,

with duration of drinking accounting for an additional 7% of the variance in step two (R^2 = 0.27). Once again, the addition of movement in the final step did not account for any additional variance in eBAC on the night of the referral (R^2 = 0.26; see Table 2).

The results of the regression predicting event-related cognitions are presented in Table 3. With respect to personal responsibility, endorsing pregaming was not a significant predictor in the first step of the model. Adding duration of drinking to the model explained an additional 6% in personal responsibility (R^2 = 0.08) and was the only significant predictor of perceived responsibility for the alcohol violation in the full model. In the final step, adding movement explained 3% more of the variance in personal responsibility (R^2 = 0.10) but was not a significant predictor. None of the pregaming behaviors significantly predicted aversiveness to the violation ($p > .05$).

Discussion

Pregaming is a common phenomenon on college campuses and has been linked to increased alcohol consumption and related problems (Barnett et al., 2013; Borsari et al., 2007; Read et al., 2010; Zamboanga et al., 2010). However, the manner in which pregaming increases student risk for alcohol related harm is unclear. To the best of our knowledge, this is the first study to examine the predictive role of different aspects of pregaming (pregaming endorsement, duration of drinking episode, and movement from one place to another) on alcohol consumption as well as event-related cognitions among mandated college students on the night of an alcohol violation. Results of the current study indicated that pregaming and duration of drinking predicted alcohol consumption and eBAC, whereas movement to a different location did not. Interestingly, duration of drinking was the only significant predictor of perceived personal responsibility for the occurrence of the alcohol violation, and no aspects of pregaming were significantly associated with the violation's perceived aversiveness.

Consistent with prior research, the results of the current study suggest that pregaming influences alcohol consumption and elevated eBAC primarily by the rapid consumption of large quantities of alcohol (LaBrie & Pedersen, 2008; Pedersen & LaBrie, 2007) over longer periods of time (Aitken & Jahoda, 1983). Interestingly, movement to a different location throughout the evening did not influence alcohol consumption. Although movement is often implicated in pregaming (Wells et al., 2009), higher consumption rates and elevated eBACs may be impacted more by the fact that those who pregame are more likely to begin drinking earlier and continue drinking throughout the night, regardless of whether or not they end up moving to another location. Alternatively, although students may initially plan on consuming alcohol in multiple locations, they might ultimately decide to stay in their current location as they continue to drink. Many pregaming episodes (and the majority of those reported in this sample), begin in a dormitory or residential setting (Pedersen & LaBrie, 2007).

There are a number of alternate scenarios which may take place that limit college students' movement on a given night of drinking. It may be, instead of going to a different location as initially planned students decided to invite others to their residence and host their own party or students became too intoxicated and/or less motivated to move. Finally, students may

have been caught drinking and received the alcohol violation prior to moving to the planned destination. Another explanation may be that those who did move to another location (especially a bar/club setting) stopped drinking upon arrival at the new destination. Read et al. (2010) found that students under the legal drinking limit reported pregaming more frequently than students over age 21 as an attempt to consume alcohol when it would otherwise be prohibited due to legal drinking age. In this case, movement would not impact their alcohol consumption as much as the pregaming itself and length of time spent drinking. That said, although pregaming is typically conceptualized as a planned behavior, there may be cases in which ones does not plan to pregame but, as a result of rising intoxication levels, decides to continue drinking or move locations. In this situation, students may not have reported their drinking behaviors as pregaming.

Interestingly, none of the variables of interest predicted aversiveness associated with the alcohol violation. This is inconsistent with prior research, in which pregaming and movement have been linked to hospitalizations, drunk driving, alcohol poisoning, assault, aggressive/violent acts and other adverse experiences (Ahmed et al., 2014; DeJong et al., 2010; Hughes et al., 2008; LaBrie & Pedersen, 2008; Pedersen & LaBrie, 2007) However, the majority of participants in the current study were cited for possession of alcohol or being in the presence of alcohol, both of which may occur without one's experiencing significant harm. Therefore, it is possible that participants in this sample were given citations prior to experiencing significant harm and, accordingly, perceived the campus alcohol violation as relatively low in aversiveness or harm in comparison to the outcomes they could have experienced (e.g., alcohol poisoning, assault). Furthermore, we only measured perceived aversiveness, not actual negative consequences experienced on the night of the incident which may differ from the adverse events described in prior studies. This finding supports thebrk continued enforcement of drinking regulations as if a citation has the potential to reduce future unwanted consequences.

Although both pregaming and duration of drinking influenced the amount of alcohol consumed, our results indicated that only length of time spent consuming alcohol predicted an individual's perceptions of personal responsibility for the event. Students who spent a longer time consuming alcohol on the night of the referral incident were more likely to assume personal responsibility for the alcohol violation, whereas pregaming and movement did not have an impact. This may have occurred for a variety of reasons. For example, it is possible that those who consumed alcohol for longer periods of time got caught later in the evening and attributed getting caught to the fact that they were out late, rather than to their pregaming, which may have occurred earlier in the evening. Hence, unless the pregaming and/or movement occurred immediately prior to the citation, students might not have linked it to the violation. However, participants were not specifically asked about the association of their pregaming to their alcohol violation. Perhaps, if they were asked to report on what they felt contributed to their violation they may endorse behaviors such as pregaming and movement. Similarly, the longer a student stayed out, the more obvious their drinking behaviors may have been (drinking while others are in bed), contributing to the perceived responsibility. Additionally, students may be aware that the longer they spent time drinking, the more intoxicated they were, increasing their likelihood of getting caught. Students who drank for a shorter period of time, on the other hand, might have attributed the violation to

bad luck or to elements outside of their immediate control (i.e., other students being loud or causing problems).

These findings have implications for clinical and intervention efforts. College students who engage in heavy drinking rarely identify as having a problem with alcohol (Buscemi et al., 2010; Caldwell, 2002; Knight et al., 2002) and are not likely to seek help on their own (Colby et al., 2000). If clinicians were aware of the specific behaviors that are related to perceived responsibility to alcohol violations, they could target these behaviors in interventions and hopefully reduce their occurrence. Regarding broader intervention efforts, consistent with recommendations of prior studies (Barnett et al., 2013; Zamboanga et al., 2013), interventions should continue focusing on reducing pregaming and its associated consequences, especially for those who report a longer duration of drinking following their pregaming episode. Furthermore, duration of drinking appears to be predictive of perceived responsibility, in that longer time spent consuming alcohol was the only significant predictor of perceived responsibility in receiving an alcohol violation. Because personal responsibility is related to increased motivation to change drinking behaviors (Barnett et al., 2002; Barnett et al., 2003; Barnett et al., 2006), length of time spent drinking may be an ideal target behavior in interventions with mandated students. Clinicians may be able to link pregaming and time spent drinking as a way to reduce those two risky behaviors. Although moving locations do not appear to predict increased drinking or event-related cognitions, it may be a risk factor for other consequences inherent in transporting oneself from place to place while drinking (drunk driving, falls). Finally, freshmen in the current study were less likely than older students to report pregaming, indicating that freshman year may be an ideal time for targeted pregaming prevention efforts to reduce the likelihood of these events occurring as students transition to sophomore year.

The results of the study should be interpreted in the context of its limitations. Participants in the study were young adult college students from a single geographic area, which may limit the generalizability of findings to other samples of drinkers. For example, a minority of participants in this study reported pregaming and moving to a different location on the night of the referral incident. This may be due to the type of campus in which the majority of students live (i.e., in the dorm rooms rather than a location requiring a commute). Hence, results may differ for universities in which travel and movement are more common. Additionally, the definition of pregaming on our survey provided examples of reasons to preparty/pregame which may have unintentionally prevented students form endorsing pregaming when they, otherwise, would have met criteria. However, qualitative research indicates college students tend to define pregaming in a similar manner to our definition (DeJong et al., 2010). Furthermore, we did not measure the duration of drinking of the pregaming episode. Other than the actual citation, we did not assess for alcohol-related problems on the night of the incident. Future research may want to incorporate such measures in order to examine the impact of these pregaming variables on alcohol-related problems. Finally, data were collected via self-report, which did not include corroborating measures and may be impacted by memory effects. Previous research with collateral informants (Borsari & Muellerleile, 2009) revealed that mandated students may slightly underreport their alcohol use, and perhaps this occurred during this trial. Similarly, students

may inaccurately report on their perceived responsibility and averseness of the incident due to their participation in a school sanctioned intervention.

In conclusion, self-endorsement of pregaming and the duration of the drinking episode appear to be more crucial in determining elevated alcohol consumption than changing locations while drinking. Duration of drinking appears to be more important than both pregaming and movement in evoking personal responsibility for campus policy violations. It is recommended that prevention and intervention efforts incorporate pregaming and length of time drinking in an attempt to reduce risky alcohol consumption.

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Notes on contributors

Ali Yurasek, PhD, is a second-year postdoctoral research fellow at the Center for Addiction Studies at Brown University. She received her PhD in clinical psychology from the University of Memphis in 2014. She is focusing on the development and evaluation of brief motivational interventions for marijuana and alcohol use in a variety of populations including college students, adolescents, and youth involved in the juvenile justice system. Her particular interest is in examining behavioral economic concepts as mechanisms of change.

Mary Beth Miller, PhD, is a first-year postdoctoral research fellow at the Center for Alcohol and Addiction Studies at Brown University. Her research aims to enhance understanding of the etiology of substance use disorders in order to improve the effectiveness and efficiency of treatment. She is particularly interested in the interplay of substance use and sleep disorders and the process by which personalized feedback on one's health and behaviors may facilitate behavior change.

Nadine Mastroleo, PhD, assistant professor in the PhD Program in Community and Public Affairs at Binghamton University, completed her PhD in counselor education and supervision from The Pennsylvania State University in 2008. Her primary area of research is evaluating brief alcohol interventions with college students and individuals who drink heavily. Specifically, she examines the within-session behaviors of brief motivational interventions to study the mechanisms of behavior change. She is also working on the implementation of multirisk brief, behavioral interventions with emergency department patients, and developing evidence-based intervention approaches to reduce drinking among student athletes.

Vanessa Lazar, MA, BA, holds a BA in psychology and MA in marine affairs from the University of Rhode Island. During her time as a research assistant at Brown University she assisted with various research projects focusing on college student drinking.

Brian Borsari, PhD, received his PhD in clinical psychology from Syracuse University in 2003. Dr. Borsari is currently a Health Behavior Consultant and Clinician Researcher at the San Francisco Veterans Affairs Medical Center. His research interests there involve the assessment and treatment of addictive behaviors, training VA staff in motivational interviewing and other client-centered communication to facilitate behavior change, and developing interventions to assist student service members/veterans who are attending college. He is also Professor in Residence in the Department of Psychiatry at the University of California, San Francisco. His research conducted through the Northern California Institute of Research and Education (NCIRE) include the development and implementation of brief motivational interventions with college student drinkers, the social influences on

alcohol (e.g., modeling and norms), high-risk behaviors such as pregaming and drinking games, development and evaluation of interventions using mobile technology, and in-session processes of motivational interviewing that are related to behavior change.

Glossary

Duration of drinking episode	Length of time between reported time of first drink until the reported time of alcohol violation.
Event-related cognitions	Participant's responses to the alcohol violation (e.g., perceived responsibility for and aversiveness of the citation).
Movement/change in location	Movement to one or more different location(s) at some point during the night.
Pregaming	Consuming alcohol in anticipation of a subsequent social event.

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Table 1

Comparisons of pregamers and nonpregamers on demographic, movement, alcohol use, and event-related cognitions.

	Pregamers (*N* = 40)	Nonpregamers (*N* = 73)	*t*-statistic (*df*)	χ^2
Age	18.78 (0.77)	18.60 (0.74)	$t(111) = -1.17$	
Gender				0.42
Male	62.5	68.5		
Female	37.5	31.5		
Race				
White	100	100		-
Nonwhite	0.00	0.00		
Year in school				10.89**
Freshmen	50.0	74.0		
Sophomore	45.0	16.4		
Upperclassmen	5.0	9.6		
GPA	3.06 (0.46)	2.99 (0.49)	$t(111) = -1.17$	
Duration of drinking (hours) - *M* (*SD*)	3.29 (1.77)	2.31 (1.55)	$t(100) = 2.93$**	
Movement (%)				10.02**
Did not change locations	26.0	56.8		
Changed locations	74.0	43.2		
Number of drinks - *M* (SD)	9.38 (4.67)	4.84 (4.15)	$t(110) = 5.31$***	
eBAC - *M* (SD)	0.17 (0.08)	0.10 (0.08)	$t(103) = 4.65$***	
Aversiveness - *M* (SD)	3.26 (1.58)	3.61 (1.80)	$t(111) = 1.03$	
Personal Responsibility - *M* (SD)	4.84 (1.60)	4.17 (1.77)	$t(111) = 1.98$*	

** *Note*. $p < .01$,

*** $p < .001$.

Table 2

Hierarchical linear regression predicting number of drinks consumed and eBAC on night of incident ($N = 99$).

	Drinks consumed on night of incident				eBAC on night of incident			
Predictor	***B***	***SEB***	***β***	***Adj. R^2***	***B***	***SEB***	***β***	***Adj. R^2***
Step 1				0.22***				0.21***
Pregaming	4.51	0.85	0.47***		0.08	0.02	0.46***	
Step 2				0 30***, [a]				0.27**,[a]
Pregaming	3.62	0.84	0.38***		0.07	0.16	0.38***	
Duration	0.88	0.24	0 32***		0.14	0.01	0.27**	
Step 3				0.30				0.26
Pregaming	3.73	0.87	0.39***		0.06	0.02	0.39***	
Duration	0.92	0.25	0.33***		0.01	0.01	0.28**	
Movement	−0.49	0.90	−0.05		−0.00	0.02	−0.02	

*Note. $p < .05$,

**$p < .01$

[a]Significant change in adjusted R^2. Pregaming = yes/no pregamingon the night of the incident. Duration = number of hours between first drink and reported time of referral incident. Movement = stayed in same location or moved to different location.

Table 3

Hierarchical linear regression predicting responsibility and aversiveness of referral incident ($N = 99$).

	Event-related cognitions							
	Responsibility				Aversiveness			
Predictor	***B***	***SEB***	***β***	**Adj. R^2**	***B***	***SEB***	***β***	**Adj. R^2**
Stepl			0.02			−0.00		
Pregaming	0.61	0.35	0.18		−0.28	0.35	−0.08	
Step 2			0.08 **,a			.00		
Pregaming	0.34	0.35	0.10		−0.42	0.36	−0.12	
Duration	0.27	0.10	0.27 *		0.14	0.10	0.14	
Step 3			0.10 **			.05		
Pregaming	0.18	0.37	0.05		−0.61	0.36	−0.18	
Duration	0.21	0.10	0.21 *		0.07	0.11	0.07	
Movement	0.71	0.37	0.20		0.86	0.38	0.25	

*Note. $p < .05$,

** $p < .01$,

*** $p < .001$.

[a]Significant change in adjusted R^2. Pregaming = yes/no pregaming on the night of the incident. Duration = number of hours between first drink and reported time of referral incident. Movement = stayed in same location or moved to different location.