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Journal

The American Journal of Drug and Alcohol Abuse, 40(5)

ISSN

0095-2990

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Publication Date

2014-09-01

DOI

10.3109/00952990.2014.936443

Peer reviewed



Published in final edited form as:

Am J Drug Alcohol Abuse. 2014 September ; 40(5): 367–373. doi:10.3109/00952990.2014.936443.

Drinking games, tailgating, and pregaming: Precollege predictors of risky college drinking

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Abstract

Background—The transition from high school to college is a critical period for developing college drinking habits. Hazardous alcohol consumption increases during this period, as well as participation in drinking games, pregaming, and tailgating. All of these risky drinking practices are associated with higher levels of intoxication as well as an increased risk of alcohol-related problems.

Objective—The current study aimed to evaluate pre-college predictors (personality, social norms, and beliefs reflecting the internalization of the college drinking culture [ICDC]) of estimated peak BAC (pBAC) reached during drinking games, pregaming, and tailgating, as well as pBAC and alcohol-related problems during the first 30 days of college.

Methods—Participants ($n = 936$) were incoming freshmen at a large university who completed a baseline assessment prior to college matriculation and a follow-up assessment after they had been on campus for 30 days.

Results—Using path analysis, ICDC was significantly associated with pBAC reached during the three risky drinking practices. ICDC had an indirect effect on both pBAC and alcohol-related problems via pBAC from drinking games, pregaming, and tailgating. Hopelessness and sensation seeking were significantly related to alcohol use outcomes.

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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 this paper.

Conclusion—Precollege perceptions of the college drinking culture are a stronger predictor of subsequent alcohol use than social norms. Interventions that target these beliefs may reduce peak intoxication and associated harms experienced during the first 30 days of college.

Keywords

Alcohol beliefs; alcohol use; college student; drinking games; social norms; tailgating; personality; pregaming

Introduction

Heavy drinking among college students is a major US public health concern (1). The transition from high school to college is viewed as a critical period where many emerging adults escalate their drinking at a faster rate than their non-college attending peers (2). Drinking in college can be conceptualized as an extension of behaviors that are established in high school. Indeed, alcohol use prior to college has emerged as the best predictor of drinking during the first year of college, which is often a period of increased alcohol use and problems (3). Three drinking practices that are associated with rapid consumption and an increased risk of experiencing negative alcohol-related problems in college students are drinking games, pregaming (drinking alcohol before attending an event) (4–6) and tailgating (drinking alcohol before attending and in the general vicinity of a football game) (7). As the first few weeks of college are not only critical for college success, but also for the development of drinking behaviors (8), it is vital to evaluate correlates of heavy drinking in the context of drinking games, pregaming, and tailgating.

Predictors of heavy drinking in college

Heavy alcohol use among college students has been linked to a variety of personality traits including impulsivity, sensation seeking, hopelessness (e.g. depressed mood), and anxiety sensitivity (the fear of arousal-related bodily sensations such as rapid breathing, perspiration, and elevated heart rate) (9). These constructs may have different implications for drinking games, pregaming, and tailgating. For example, sensation seeking appears to be a more conscious, strategic process of seeking out pleasure and excitement from drinking despite possible risks and problems. Thus, with their external sense of excitement and stimuli (e.g. noises, competition, groups of people, or impending attendance at an emotionally-charged sporting event), drinking games and tailgating may appeal more to individuals high in sensation seeking. Both pregaming and tailgating may appeal to individuals high in impulsivity, as this trait suggests a loss of control in the presence of drinking cues. In contrast, those who have high anxiety sensitivity may avoid drinking games and tailgating, and prefer more intimate and subdued pregaming settings due to a heightened awareness and fear of internal body arousal. While some research indicates that personality traits similar to impulsivity are related to the initiation of pregaming in college (10), these personality traits have not been evaluated in the context of drinking games, pregaming, and tailgating.

Social norms have consistently predicted drinking before college, even after controlling for gender and personality variables (11). Two particularly influential types of norms are descriptive norms (defined as the perceived normal quantity and frequency of drinking

among one's peers) and injunctive norms (defined as the perceived morals and degree of acceptance related to drinking within one's peer group) (12). Many college students tend to overestimate both descriptive and injunctive norms, which in turn may lead students to increase their drinking habits to match elevated drinking norms (12). Descriptive norms have also been shown to play a role in pregameing (13,14), and some research suggests that injunctive norms for pregameing might significantly impact pregameing participation in male students, but not female students (15). That said, little else is known about the impact of injunctive norms on participation in other risky drinking behaviors such as drinking games and tailgating.

Another type of belief about drinking that has recently emerged in the literature is the internalization of the college drinking culture (ICDC) (11,16–18). ICDC represents the degree to which individuals identify with the college drinking culture, and this construct has been shown to be strongly related to alcohol use in both incoming and matriculated college students. ICDC is conceptually and empirically distinct from social norms (19). Whereas social norms measure an individual's perception of others' involvement in drinking, ICDC measures the degree to which an individual relates to the college drinking culture as a whole. To our knowledge, no one has yet examined the relationships between ICDC assessed prior to college and pregameing, drinking games, or tailgating when at college.

Purpose

The purpose of this study is to evaluate the relationships between pre-college variables (personality, descriptive norms, injunctive norms, and ICDC) with peak estimated blood alcohol concentrations (pBACs) for drinking games, pregameing, and tailgating, as well as overall pBAC and alcohol-related problems during the first 30 days of college. As demonstrated in Figure 1, we hypothesized that precollege ICDC and social norms would have a positive and direct effect on pBACs reached during drinking games, pregameing, and tailgating (Hypothesis 1); impulsivity and sensation seeking would have a positive and direct effect on pregameing and tailgating pBACs, while anxiety sensitivity would have a positive and direct effect on pregameing pBAC (Hypothesis 2); and precollege ICDC would have an indirect effect on pBAC and the total number of problems experienced during the past 30 days through drinking games, pregameing, and tailgating (Hypothesis 3). Findings from this study during this critical period are expected to help identify variables that are associated with risky drinking and guide future intervention efforts.

Methods

Participants and procedures

The present study was a secondary data analysis of a randomized controlled trial of an Internet-delivered alcohol intervention for incoming college students as described elsewhere (11). All incoming first-year undergraduate college students who were entering a university in the Mid-Atlantic were eligible to participate if they were over 18 years old and had a mailing address in the United States. Eligible students ($n = 1200$) were randomly selected and invited to participate in the parent study 21 days prior to the start of the fall semester at host site. The majority ($n = 936$; 78%) consented to participate and completed the baseline

assessment up until one day prior to the start of the fall semester. On average, participants completed the baseline survey 13.82 (SD =6.09) days prior to the start of the fall semester. Following the baseline appointment, participants were randomly assigned to either the Internet-delivered alcohol education ($n=454$) or assessment-only condition ($n=482$). Participants in the intervention condition viewed a 1-hour, peer-delivered video about the effects of alcohol on the body, alcohol-related policies and laws, and received personalized feedback (20) over the Internet. However, the intervention did not target drinking games, pregameing, or tailgating. The intervention had a small effect on drinks consumed on a typical drinking day at follow-up versus the control group after controlling for baseline values (Cohen's $d=0.18$; $p=0.02$). However, groups did not differ according to drinks per week, pBAC, and the number of alcohol-related problems.

Participants were 50% female ($n=465$) with an average age of 18.06 (SD =0.29). Race/ethnicity was 79.4% White, 4.1% Hispanic, 4.9% Asian, 4.2% Black or African American, and 7.5% were classified as other. The majority of participants ($n=817$; 87%) completed a follow-up survey after they had been on campus for 30 days. Participants were entered in a draw to receive one of 10 \$50 gift cards.

Measures

Personality variables—Four distinct personality traits (hopelessness, impulsivity, anxiety sensitivity, and sensation seeking) were assessed using the Substance Use Risk Profile Scale (SURPS) (9). The SURPS has been validated using both high school and college student samples, has good internal consistency, convergent and discriminant validity, and 2-month test-retest reliability (9).

Social norms—Descriptive norms were assessed by asking participants to estimate the amount of alcohol consumed by a typical college student of the same gender at the host site for each day of a typical drinking week during the past 30 days (21). Descriptive norms were calculated by summing each of the daily responses. Injunctive norms were assessed by a single item regarding what they believe best represents “the most common attitude” among college students at the host site about alcohol use using a 5-point response scale (1 = “drinking is never a good thing to do” to 5 = “getting drunk frequently is okay if that’s what the individual wants to do”) (22). Previous research has shown that injunctive norms in college student samples are comparable when using a single-item measure or multi-item measures (23,24).

Internalization of the college drinking culture (ICDC)—The 15-item College Life Alcohol Salience Scale (CLASS) assessed ICDC (e.g. “College is a time for experimentation with alcohol”) using a 5-point response scale (1 = “strongly disagree, 5 = “strongly agree”) (25).

Heavy drinking and problems—Participants reported the “largest number of standard drinks” that they “consumed on a single day in the last 30 days” and the amount of time that they spent consuming the largest number of drinks in the past 30 days. Along with gender and weight, these numbers were then used to estimate peak blood alcohol concentration

(pBAC) (26,27). Alcohol-related problems during the past 30 days were assessed with the Brief Young Adult Alcohol Consequences Questionnaire (28). These measures were assessed at baseline and 30 days after the start of college.

Risky drinking practices—Drinking games were defined as activities that are played to increase alcohol use (e.g. beer pong, flip cup, power hour, etc.). Although similar, tailgating and pregaming occur in different environments: tailgating was defined as drinking before a football game (not other sports or concerts) and pregaming was defined as drinking “before you go out for the night (e.g. in your home/room or a friend’s home/room)” (4). Participants were specifically required to differentiate tailgating from pregaming. Participants were asked to report the highest number of standard drinks they consumed and the amount of time (in hours and minutes) spent drinking for each of these three drinking practices in the past 30 days using an open-ended numerical response. Items from this measure were used to estimate pBAC for these episodes consistent with the previous description. This measure was only administered at follow-up.

Data analysis plan

Path analysis was conducted to examine predictors of pBAC and problems using Mplus (29). Age, gender (0 =men, 1 =women), and intervention condition (0 =control, 1 =intervention) were modeled as predictors of all other variables to control for any demographic differences or any possible effects of the intervention. Hopelessness was included in the model as a covariate to account for the known relationship between depressed mood and drinking to cope (9). We examined the total, direct, and indirect (i.e. mediated) effects of each predictor variable on outcomes using the bias-corrected bootstrap based on 1000 bootstrapped samples (30). Parameters were estimated using maximum likelihood estimation, and missing data were handled using full information maximum likelihood.

Results

Descriptive statistics and bivariate correlations

The descriptive statistics and correlations among all study variables are shown in Table 1. As expected, participants reported a significant increase in pBAC, $t(817) = -7.30, p < 0.001, d = 0.258$, from precollege to college, but there was not a significant change in problems, $t(818) = 0.05, p = 0.961$. There were no significant differences in demographics, age, drinks per week, pBAC, or alcohol-related problems between intervention and assessment only groups. However, male participants were less likely to complete the 1-month follow-up than female participants ($\chi^2 [1] = 7.80, p = 0.005; \phi = -0.091$). Those who completed the 1-month follow-up were not significantly different from those who did not according to the remaining demographic, personality, and alcohol use variables.

Sensation seeking and impulsivity were moderately correlated ($r = 0.31$), but the remaining correlations among the personality traits were rather modest ($rs < |0.20|$). The alcohol beliefs variables were all modestly positively related to each other ($0.10 < rs < 0.29$). The modest correlations among personality and alcohol beliefs variables suggest that they could have

unique associations with alcohol outcomes, and that multicollinearity would not pose a significant problem. All alcohol involvement variables were significantly positively related to each other in the moderate to large range ($0.28 < r_s < 0.76$). In light of the results presented below, it is noteworthy that descriptive norms was positively related to all alcohol outcomes at a bivariate level, though in every case, these correlations were weaker than the bivariate correlations between ICDC and alcohol outcomes.

Path analysis

The significant direct effects of our primary study variables on outcomes are shown in Figure 2, and all direct effects of precollege variables on outcomes are presented in Table 2. Precollege pBAC and problems were significantly positively associated with each of the three risky drinking practices. ICDC was significantly associated with all three risky drinking practices after controlling for other variables, consistent with Hypothesis 1. Hopelessness and sensation seeking were negatively associated with tailgating pBAC, whereas sensation seeking was positively associated with drinking games pBAC, which was inconsistent with Hypothesis 2. No other personality or social norms variable had a significant association with the risky drinking practices when controlling for all other variables in the model. While controlling for other variables, sensation seeking, ICDC, pregameing pBAC, and drinking games pBAC had positive direct effects on pBAC in college, whereas tailgating did not. Conversely, tailgating pBAC had a significant positive direct effect on problems (as did hopelessness), whereas pBAC from pregameing and drinking games did not.

Consistent with Hypothesis 3, the indirect effects of ICDC on pBAC and alcohol-related problems via risky drinking practices were significant (see Table 3). Specifically, pBACs from pregameing and drinking games significantly mediated the association between ICDC and pBAC. Either through pBAC (pregameing and drinking games pBACs) or directly (pBACs from pregameing and tailgating), pBAC from these drinking practices also mediated the association between ICDC and problems.

Discussion

This study investigated predictors of future alcohol use and alcohol-related problems during the first 30 days of college in a prospective study of incoming first-year college students. Findings from this study during this critical period are expected to help identify variables that are associated with risky drinking and guide future prevention and intervention efforts. Hypothesis 1 was partially supported as precollege ICDC was the only alcohol belief variable that was related to pBAC in all three risky drinking practices. pBACs reached during pregameing and drinking games were associated with higher pBACs (which in turn were related to alcohol-related problems), whereas pBACs from tailgating were associated with alcohol-related problems. In contrast to previous research (14), findings indicate that both drinking games and pregameing are differentially associated with an increased risk of alcohol-related problems, perhaps due to controlling for additional variables and the assessment of these behaviors during the first month of college using a sample of first-year students. Consistent with Hypothesis 2, the effect of ICDC on overall pBAC at follow-up

was mediated by higher pBACs from pregaming and drinking games. In addition, the effects of pregaming and drinking games pBACs on problems were mediated by overall pBAC, assessed during college. Collectively, these findings indicate that each of these drinking practices are distinct behaviors, and more effective prevention programs aimed at reducing heavy drinking during high school are needed as drinking games and pregaming are prevalent in high school and drinking in high school is strongly associated with drinking in college (31,32). Notably, ICDC appears to be a powerful motivator for drinking, which is consistent with Cox and Klinger's motivational model of alcohol use as students who identify with the drinking culture appear to behave in a manner consistent with these beliefs across diverse high-risk drinking situations (33).

There were also some unexpected findings. First, of all personality measures, only hopelessness was significantly related to alcohol-related problems directly. This finding is consistent with previous findings indicating that depressed mood is significantly related to alcohol-related problems via drinking to cope and negative urgency (difficulties with self-regulation and decision making when distressed) (34). Second, sensation seeking was negatively associated with tailgating pBAC. Potentially, underage students view tailgating as socially acceptable, so there might be less excitement in drinking in public while underage than there would be if tailgating by underage individuals was less acceptable. No other personality measures were significantly associated with any of the three drinking practices when controlling for other variables. Third, social norms were not associated with: (a) pBACs reached during each of the three risky drinking practices, (b) pBAC during college, and (c) alcohol-related problems during college when controlling for other variables. Previous research has indicated that descriptive norms might play a role in pregaming participation and drinking in college (13,35). Based on these and other findings, ICDC assessed before college appears to be a stronger predictor of alcohol use and problems during college than social norms (11,16).

The purpose of the current study was not to evaluate an alcohol education program. However, consistent with previous research (36), these results indicate that alcohol education is not related to decreased pBAC and problems. However, this program also included personalized feedback, which has been found to be an efficacious intervention to reduce heavy drinking (37). It is possible that the 1-hour intervention diluted the effects of personalized feedback or that treatment diffusion occurred as all students at the host site, minus the control group, received the intervention.

Limitations and clinical implications

These findings should be considered in the context of several limitations, including the generalizability of these results to other colleges, the accuracy of self-report, the modest internal consistency of the personality measure, and the fact that this was not an event-level study. That said, these findings have meaningful clinical implications for future alcohol prevention strategies and interventions. ICDC is a relatively new construct that is not directly targeted in alcohol interventions. New interventions that target ICDC prior to and during college might be helpful, including interventions that increase the perceived importance of academic achievement and substance free activities (11,16,19,25). Based on

these findings, reducing these beliefs may help reduce pBACs reached during high-risk drinking events, overall pBAC, and alcohol problems.

Conclusion

In summary, these three drinking practices have unique effects on pBAC and problems, suggesting that these behaviors are distinct styles of risky drinking. In addition, these results indicated that sensation seeking, hopelessness, and ICDC assessed prior to college are associated with alcohol use and/or problems during college. Interventions that target ICDC may reduce specific (e.g. drinking games pBAC) and general hazardous drinking episodes during the critically important first 30 days of college.

Acknowledgments

Matthew Pearson's contribution was supported by a National Institute on Alcohol Abuse and Alcoholism (NIAAA) training grant T32-AA018108. John Hustad's contribution to this paper was supported by the National Center for Research Resources and the National Center for Advancing Translational Sciences, National Institutes of Health (NIH), through Grant UL1RR033184 and KL2RR033180. Brian Borsari's contribution to this paper was supported by National Institute on Alcohol Abuse and Alcoholism Grants R01-AA015518 and R01-AA017874. The contents of this paper do not represent the views of the NIH, National Institute on Alcohol Abuse and Alcoholism, the Department of Veterans Affairs or the United States Government.

References

1. US Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2020. Washington, DC: 2012.
2. Blanco C, Okuda M, Wright C, Hasin DS, Grant BF, Liu SM, Olfson M. Mental health of college students and their non-college-attending peers: results from the National Epidemiologic Study on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2008; 65:1429–1437. [PubMed: 19047530]
3. Borsari B, Murphy JG, Barnett NP. Predictors of alcohol use during the first year of college: implications for prevention. *Addict Behav*. 2007; 32:2062–2086. [PubMed: 17321059]
4. Borsari B, Boyle KE, Hustad JTP, Barnett NP, O'Leary Tevyaw T, Kahler CW. Drinking before drinking: pre-gaming and drinking games in mandated students. *Addict Behav*. 2007; 32:2694–2705. [PubMed: 17574344]
5. Barnett NP, Orchowski LM, Read JP, Kahler CW. Predictors and consequences of pre-gaming using day- and week-level measurements. *Psychol Addict Behav*. 2013; 27:921–933. [PubMed: 23438241]
6. Merrill JE, Vermont LN, Bachrach RL, Read JP. Is the pregame to blame? Event-level associations between pre-gaming and alcohol-related consequences. *J Stud Alcohol Drugs*. 2013; 74:757. [PubMed: 23948535]
7. Hustad JTP, Mastroleo NR, Urwin R, Zeman S, LaSalle L, Borsari B. Tailgating and pre-gaming by college students with alcohol offenses: patterns of alcohol use and beliefs. *Subst Use Misuse*. (in press).
8. Upcraft, M. Today's first-year students and alcohol. Task Force on College Drinking, National Advisory Council on Alcohol Abuse and Alcoholism; Bethesda, MD: 2002.
9. Woicik PA, Stewart SH, Pihl RO, Conrod PJ. The substance use risk profile scale: a scale measuring traits linked to reinforcement-specific substance use profiles. *Addict Behav*. 2009; 34:1042–1055. [PubMed: 19683400]
10. Haas AL, Smith SK, Kagan K. Getting "game": pre-gaming changes during the first weeks of college. *J Am Coll Health*. 2013; 61:95–105. [PubMed: 23409859]
11. Hustad JTP, Pearson MR, Neighbors C, Borsari B. The role of alcohol perceptions as mediators between personality and alcohol-related outcomes among incoming college student drinkers. *Psychol Addict Behav*. 2014; 28:336–347. [PubMed: 24467197]

12. Borsari B, Carey KB. Descriptive and injunctive norms in college drinking: a meta-analytic integration. *J Stud Alcohol*. 2003; 64:331–341. [PubMed: 12817821]
13. Burger JM, LaSalvia CT, Hendricks LA, Mehdipour T, Neudeck EM. Partying before the party gets started: the effects of descriptive norms on pregame behavior. *Basic Appl Soc Psych*. 2011; 33:220–227.
14. Pedersen ER, Labrie JW. Normative misperceptions of drinking among college students: a look at the specific contexts of prepartying and drinking games. *J Stud Alcohol Drugs*. 2008; 69:406–411. [PubMed: 18432383]
15. Rutledge PC, McCarthy BJ, Lendyak RM. Let's get this party started: the effects of descriptive and injunctive norms on preparty behavior in college students. *Subst Use Misuse*. 2014; 49:166–175.
16. Osberg TM, Insana M, Eggert M, Billingsley K. Incremental validity of college alcohol beliefs in the prediction of freshman drinking and its consequences: a prospective study. *Addict Behav*. 2011; 36:333–340. [PubMed: 21196082]
17. Qi D, Pearson M, Hustad JTP. The role of alcohol beliefs on motivation to change college student drinking habits. *Psychol Addict Behav*. 2014; 28:524–531. [PubMed: 24750039]
18. Pearson MP, Hustad JTP. Personality and alcohol-related outcomes among mandated college students: descriptive norms, injunctive norms, and college-related alcohol beliefs as mediators. *Addict Behav*. 2014; 39:879–884. [PubMed: 24589869]
19. Osberg TM, Billingsley K, Eggert M, Insana M. From Animal House to Old School: a multiple mediation analysis of the association between college drinking movie exposure and freshman drinking and its consequences. *Addict Behav*. 2012; 37:922–930. [PubMed: 22507304]
20. Miller MB, Leffingwell T, Claborn K, Meier E, Walters S, Neighbors C. Personalized feedback interventions for college alcohol misuse: an update of Walters & Neighbors (2005). *Psychol Addict Behav*. 2013; 27:909–920. [PubMed: 23276309]
21. Baer JS, Stacy A, Larimer ME. Biases in perception of drinking norms among college students. *J Stud Alcohol*. 1991; 52:580–586. [PubMed: 1758185]
22. Perkins HW, Berkowitz AD. Perceiving the community norms of alcohol use among students: some research implications for campus alcohol education programming. *Int J Addict*. 1986; 21:961–976. [PubMed: 3793315]
23. Mallett KA, Bachrach RL, Turrisi R. Examining the unique influence of interpersonal and intrapersonal drinking perceptions on alcohol consumption among college students. *J Stud Alcohol Drugs*. 2009; 70:178–185. [PubMed: 19261229]
24. Neighbors C, O'Connor RM, Lewis MA, Chawla N, Lee CM, Fossos N. The relative impact of injunctive norms on college student drinking: the role of reference group. *Psychol Addict Behav*. 2008; 22:576–581. [PubMed: 19071984]
25. Osberg TM, Atkins L, Buchholz L, Shirshova V, Swiantek A, Whitley J, Hartman S, Oquendo N. Development and validation of the College Life Alcohol Salience Scale: a measure of beliefs about the role of alcohol in college life. *Psychol Addict Behav*. 2010; 24:1–12. [PubMed: 20307107]
26. Matthews DB, Miller WR. Estimating blood alcohol concentration: two computer programs and their applications in therapy and research. *Addict Behav*. 1979; 4:55–60. [PubMed: 420046]
27. Hustad JTP, Carey KB. Using calculations to estimate blood alcohol concentrations for naturally occurring drinking episodes: a validity study. *J Stud Alcohol*. 2005; 66:130–138. [PubMed: 15830913]
28. Kahler CW, Strong DR, Read JP. Toward efficient and comprehensive measurement of the alcohol problems continuum in college students: the Brief Young Adult Alcohol Consequences Questionnaire. *Alcohol Clin Exp Res*. 2005; 29:1180–1189. [PubMed: 16046873]
29. Muthén, LK.; Muthén, BO. *Mplus User's Guide*. 6. Los Angeles, CA: Muthén & Muthén; 1998–2011.
30. Efron, B.; Tibshirani, R. *An introduction to the bootstrap*. New York: Chapman and Hall; 1993.
31. Zamboanga BL, Borsari B, Ham LS, Olthuis JV, Van Tyne K, Casner HG. Pregaming in high school students: relevance to risky drinking practices, alcohol cognitions, and the social drinking context. *Psychol Addict Behav*. 2011; 25:340–345. [PubMed: 21443300]

32. Kenney SR, Hummer JF, LaBrie JW. An examination of prepartying and drinking game playing during high school and their impact on alcohol-related risk upon entrance into college. *J Youth Adolesc.* 2010; 39:999–1011. [PubMed: 19904593]
33. Cox WM, Klinger E. A motivational model of alcohol use. *J Abnorm Psychol.* 1988; 97:168–180. [PubMed: 3290306]
34. Gonzalez VM, Reynolds B, Skewes MC. Role of impulsivity in the relationship between depression and alcohol problems among emerging adult college drinkers. *Exp Clin Psychopharmacol.* 2011; 19:303–313. [PubMed: 21480733]
35. Read J, Wood M, Davidoff O, McLacken J, Campbell J. Making the transition from high school to college: the role of alcohol-related social influence factors in students' drinking. *Subst Abus.* 2002; 23:53–65. [PubMed: 12444360]
36. Larimer ME, Cronce JM. Identification, prevention and treatment: a review of individual-focused strategies to reduce problematic alcohol consumption by college students. *J Stud Alcohol Suppl.* 2002; 14:148–163. [PubMed: 12022721]
37. Scott-Sheldon LA, Carey KB, Elliott JC, Garey L, Carey MP. Efficacy of alcohol interventions for first-year college students: a meta-analytic review of randomized controlled trials. *J Consult Clin Psychol.* 2014; 82:177–188. [PubMed: 24447002]

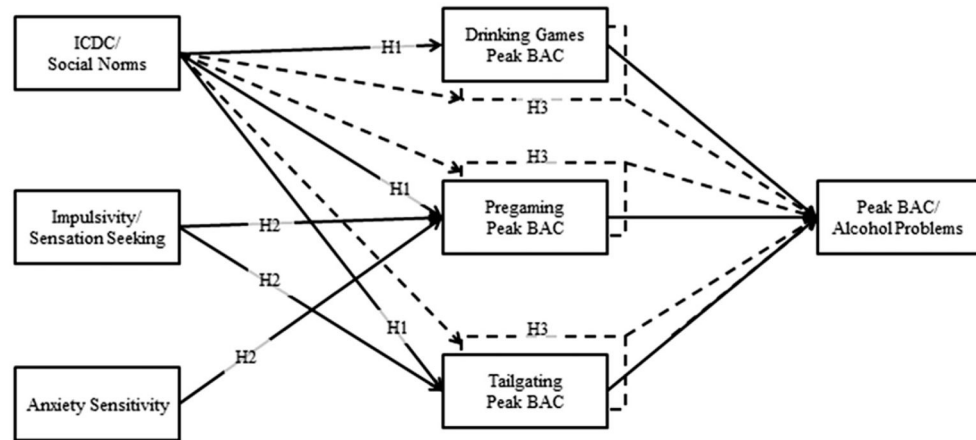


Figure 1.

The research hypotheses. ICDC, internalization of the college drinking culture measured by the College Life Alcohol Salience Scale (CLASS); H, hypothesis. Solid lines indicate hypothesized direct effects. Dotted lines represent hypothesized indirect effects.

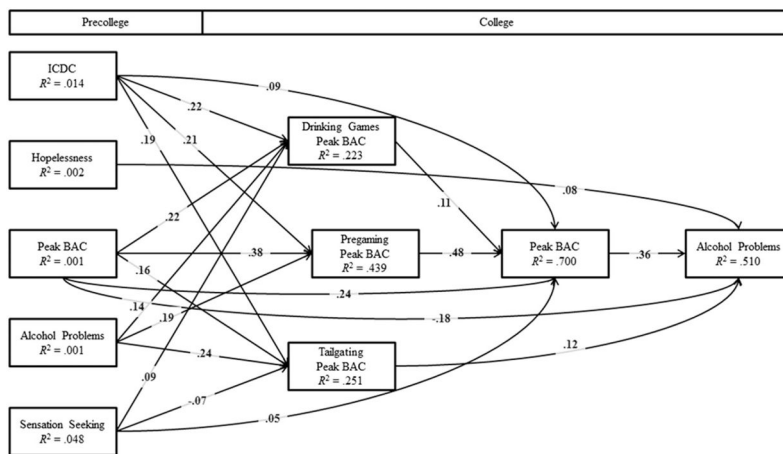


Figure 2. Observed relationships between precollege variables and alcohol-related outcomes in the first 30 days of college. ICDC, internalization of the college drinking culture measured by the College Life Alcohol Salience Scale (CLASS); BAC, estimated blood alcohol concentration. Gender and condition were modeled as predictors of all variables, but are not shown for reasons of clarity. Descriptive norms, injunctive norms, impulsivity, and anxiety sensitivity are not shown in the figure as they did not have any significant direct effects on any of the other variables in the model, but their effects on outcomes were estimated and controlled for in all analyses. All estimated BACs are multiplied by 100 to increase interpretability.

Table 1

Correlations, means, standard deviations, and Cronbach's alphas for study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	M	SD
1. Hopelessness	<u>0.86</u>															9.52	3.02
2. Sensation seeking	-0.13	<u>0.65</u>														13.46	4.55
3. Anxiety sensitivity	-0.07	-0.19	<u>0.68</u>													11.26	3.95
4. Impulsivity	0.18	0.31	-0.02	<u>0.69</u>												5.60	5.56
5. ICDC	0.06	0.19	-0.11	0.21	<u>0.92</u>											37.58	10.92
6. Injunctive norms	0.10	-0.04	-0.00	-0.01	0.10	-										2.23	0.79
7. Descriptive norms	-0.04	0.13	-0.11	-0.11	0.29	0.19	-									16.05	12.06
8. Drinking games pBAC	0.00	0.09	-0.01	0.09	0.24	-0.05	0.14	-								0.07	0.05
9. Pregaming pBAC	-0.01	0.09	-0.02	0.13	0.42	0.10	0.27	0.46	-							0.04	0.06
10. Tailgating pBAC	-0.06	0.03	-0.03	0.12	0.33	0.04	0.21	0.34	0.54	-						0.02	0.43
11. Peak BAC (T1)	-0.02	0.17	-0.09	0.15	0.41	0.09	0.40	0.31	0.58	0.39	-					0.07	0.09
12. Alcohol problems (T1)	0.06	0.16	-0.03	0.28	0.35	0.10	0.32	0.28	0.49	0.40	0.64	<u>0.85</u>				1.86	3.11
13. Peak BAC (T2)	0.01	0.19	-0.09	0.17	0.48	0.09	0.35	0.46	0.76	0.47	0.66	0.55	-			0.09	0.10
14. Alcohol problems (T2)	0.10	0.11	-0.01	0.19	0.36	0.07	0.22	0.37	0.55	0.43	0.41	0.56	0.61	-		1.80	3.79
15. Gender	-0.04	-0.21	0.27	-0.04	-0.11	-0.01	-0.23	0.01	0.10	0.08	-0.02	0.03	-0.03	0.00	-	0.50	0.50

Significant correlations ($p < 0.05$) are in bold typeface for emphasis. Underlined values on the diagonal represent Cronbach's alphas. ICDC = Internalization of the college drinking culture measured by the College Life Alcohol Saliency Scale (CLASS).

Table 2

Summary of direct effects of precollege variables on alcohol-related outcomes.

Outcome variables:	Pregaming peak BAC			Tailgating peak BAC			Drinking games peak BAC		
	β	b	95% CI	β	b	95% CI	β	b	95% CI
Alcohol problems	0.19	0.39	0.183, 0.637	0.24	0.34	0.140, 0.572	0.14	0.24	0.054, 0.429
Overall peak BAC	0.038	0.27	0.199, 0.350	0.16	0.08	0.006, 0.137	0.22	0.13	0.056, 0.201
Injunctive norms	0.03	0.24	-0.189, 0.740	-0.00	-0.03	-0.333, 0.307	-0.07	-0.43	-1.051, 0.186
Descriptive norms	0.03	0.02	-0.015, 0.057	0.04	0.02	-0.013, 0.041	-0.02	-0.01	-0.053, 0.042
ICDC	0.21	0.12	0.083, 0.147	0.19	0.07	0.047, 0.102	0.22	0.10	0.042, 0.153
Sensation seeking	0.01	0.02	-0.058, 0.102	-0.07	-0.06	-0.140, -0.006	0.09	0.10	0.001, 0.219
Anxiety sensitivity	0.02	0.03	-0.048, 0.119	-0.02	-0.02	-0.117, 0.057	0.03	0.04	-0.081, 0.181
Impulsivity	-0.02	-0.04	-0.185, 0.089	0.03	-0.03	-0.061, 0.139	-0.04	-0.07	-0.240, 0.104
Hopelessness	-0.00	-0.01	-0.138, 0.104	-0.08	-0.12	-0.204, -0.034	0.01	0.02	-0.144, 0.197
Gender	0.13	1.71	0.964, 2.464	0.10	0.83	0.214, 1.383	0.04	0.46	-0.652, 1.414
Condition	-0.05	-0.66	-1.394, -0.002	-0.01	-0.07	-0.661, 0.463	-0.04	-0.46	-1.430, 0.437
	Overall peak BAC (Time 2)			Alcohol problems (Time 2)					
Outcome variables:	β	b	95% CI	β	B	95% CI			
Alcohol problems	0.07	0.22	-0.010, 0.451	0.36	0.37	0.259, 0.487			
Overall peak BAC	0.24	0.27	0.176, 0.358	-0.18	-0.06	-0.088, -0.036			
Injunctive norms	0.01	0.08	-0.469, 0.614	0.01	0.03	-0.240, 0.268			
Descriptive norms	0.03	0.02	-0.024, 0.072	-0.03	-0.01	-0.024, 0.010			
ICDC	0.09	0.08	0.033, 0.124	0.03	0.01	-0.012, 0.030			
Sensation seeking	0.05	0.12	0.017, 0.210	-0.00	-0.00	-0.045, 0.039			
Anxiety sensitivity	-0.02	-0.04	-0.137, 0.062	0.04	0.03	-0.030, 0.087			
Impulsivity	0.00	0.00	-0.137, 0.176	0.01	0.01	-0.065, 0.078			
Hopelessness	0.02	0.08	-0.070, 0.231	0.08	0.09	0.022, 0.186			
Gender	-0.05	-0.95	-1.831, -0.109	-0.03	-0.22	-0.654, 0.141			
Condition	-0.01	-0.09	-0.959, 0.734	-0.01	-0.05	-0.371, 0.264			
Pregaming	0.48	0.77	0.656, 0.871	0.11	0.06	-0.003, 0.113			
Tailgating	0.03	0.06	-0.083, 0.206	0.12	0.09	0.016, 0.162			
Drinking games	0.11	0.22	0.090, 0.338	0.07	0.04	-0.013, 0.095			

Outcome variables:	Pregaming peak BAC			Tailgating peak BAC			Drinking games peak BAC		
	β	b	95% CI	β	b	95% CI	β	b	95% CI
Overall peak BAC (Time 2)	-	-	-	0.36	0.11	0.077, 0.149			

ICDC = Internalization of the college drinking culture measured by the College Life Alcohol Saliency Scale (CLASS). All predictor variables in the left column are from the baseline assessment unless otherwise noted. Confidence intervals are based on the bias-corrected bootstrap with 1000 samples. All estimated pBACs multiplied by 100 to increase interpretability. Statistical significance was determined by a confidence interval that does not contain zero. Significant effects are in bold type face for emphasis.

Table 3

Selected total, indirect, and direct effects.

	β	b	95% CI
ICDC → Overall peak BAC			
Total	0.22	0.19	0.144, 0.247
Total indirect	0.13	0.11	0.083, 0.150
Pregaming peak BAC	0.10	0.09	0.065, 0.118
Tailgating peak BAC	0.01	0.00	-0.006, 0.016
Drinking games peak BAC	0.02	0.02	0.006, 0.042
Direct	0.09	0.08	0.033, 0.124
ICDC → Alcohol problems			
Total	0.17	0.05	0.023, 0.067
Total indirect	0.14	0.04	0.027, 0.051
Pregaming peak BAC	0.02	0.01	0.000, 0.014
Tailgating peak BAC	0.02	0.01	0.002, 0.013
Drinking games peak BAC	0.01	0.00	-0.001, 0.011
Overall peak BAC	0.03	0.01	0.004, 0.015
Pregaming → Peak BAC	0.04	0.01	0.006, 0.015
Tailgating → Peak BAC	0.00	0.00	-0.001, 0.002
Drinking games → Peak BAC	0.01	0.00	0.001, 0.005
Direct	0.03	0.01	-0.012, 0.030
Drinking games peak BAC → Alcohol problems			
Total	0.11	0.07	0.007, 0.118
Total indirect (via Overall peak BAC)	0.04	0.02	0.010, 0.044
Direct	0.07	0.04	-0.013, 0.095
Pregaming peak BAC → Alcohol problems			
Total	0.28	0.14	0.088, 0.194
Total indirect (via Overall peak BAC)	0.17	0.09	0.060, 0.117
Direct	0.11	0.06	-0.003, 0.113
Tailgating peak BAC → Alcohol problems			
Total	0.13	0.09	0.021, 0.173
Total indirect (via Overall peak BAC)	0.01	0.01	-0.009, 0.025
Direct	0.12	0.09	0.016, 0.162

ICDC =Internalization of the college drinking culture measured by the College Life Alcohol Salience Scale (CLASS). Only ICDC was assessed at baseline (precollege). Confidence intervals are based on the bias-corrected bootstrap with 1000 samples. Statistical significance was determined by a confidence interval that does not contain zero. Significant effects are in bold type face for emphasis.