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A national study on pregaming motives, frequency, consumption, and negative alcohol consequences among university students in the United States

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ABSTRACT

Background: Pregaming, or drinking before going out, is a commonly practiced risky behavior. Drinking motives are well-established predictors of alcohol use and negative alcohol consequences. Given the influence of context on drinking practices, motives specific to pregaming may affect pregaming behaviors and outcomes above and beyond general drinking motives. Thus, we examined how pregaming motives are related to pregaming behaviors and negative alcohol consequences.

Methods: Using data from two national cross-sectional online studies, the current study included undergraduates who pregamed at least once in the past month (n=10,200, M_{age}=19.9, women=61%, white=73.6%; 119 U.S. universities). Participants completed assessments of demographics, general drinking motives, pregaming motives, pregaming frequency/consumption, and negative alcohol consequences. Data were analyzed using hierarchical linear models accounting for nesting of participants within sites.

Results: When controlling for demographic factors and general drinking motives, interpersonal enhancement motives and intimate pursuit motives were positively associated with pregaming frequency, pregaming consumption, and negative alcohol consequences. Situational control motives were negatively associated with pregaming consumption and negative alcohol consequences. Barriers to consumption motives were negatively associated with pregaming frequency but positively associated with negative alcohol consequences.

Conclusions: Students who pregame to make the night more fun or to meet potential dating partners appear to be at particular risk for negative alcohol consequences. Motives may be modifiable, particularly via cognitive/behavioral strategies. Findings suggest that specific motives may be appropriate intervention targets when trying to reduce pregaming behaviors and negative alcohol consequences.

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1. Introduction

Pregaming (also referred to as predrinking, prepartying, or preloading) entails drinking by yourself or with others before going to an event or location where you may drink more (Zamboanga and Olthuis, 2016). Many young adults and university students in the United States (U.S.) and other countries (e.g., Ferris et al., 2019; Labhart et al., 2017; Zamboanga et al., 2021) participate in this risky practice (e.g., over 60% of U.S. university students who indicated prior alcohol use, Zamboanga and Olthuis, 2016; for additional information on prevalence, see Zamboanga et al., 2023). Decades of research indicate that pregaming is linked to higher overall drink consumption and heightened risk for adverse alcohol-related health consequences among university students in the U.S. and abroad (for reviews, see Caudwell and Hagger, 2021; Foster and Ferguson, 2014; Zamboanga et al., 2013). The prevalence of pregaming among university students and the elevated alcohol consumption and negative health consequences that are likely to occur from pregaming highlight the need for continued research into young people's motivations to pregame. Thus, using two large national samples of university students in the U.S., we examined how certain motives to pregame relate to frequency of pregaming, number of drinks consumed while pregaming, and negative drinking consequences in general, while controlling for key demographic characteristics, typical drinking behaviors, and general drinking motives.

Cox and Klinger's (1988) motivational theory of alcohol use posits that, in addition to a range of historical factors, individuals are motivated to drink for reasons derived from their situational context and their affective incentives for drinking (see also Kuntsche et al., 2005). Developed from this theoretical lens, the Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) measures four broad motives for alcohol use: social (e.g., to improve parties/celebrations), enhancement (e.g., to experience a pleasant feeling), coping (e.g., to forget about problems or worries), and conformity (e.g., to not feel left out). Subsequently, the coping motive has been separated into two dimensions (Modified-Drinking Motives Questionnaire-Revised, M-DMQ-R; Grant et al., 2007): coping-depression (e.g., it helps when feeling depressed) and coping-anxiety (e.g., to relax or reduce anxiety). The importance of examining motives for alcohol use is threefold: (1) they serve as "the final common pathway to alcohol use" (Cox and Klinger, 1988, p. 178), (2) high endorsement of certain drinking motives is associated with different consumption patterns and related outcomes (Bresin and Mekawi, 2021; for review, see Cooper et al., 2016), and (3) motives are malleable cognitive risk factors that can be targeted for intervention.

Whereas motivations to pregame can align with broad drinking motives (e.g., to be more sociable, to feel less anxious), there are motives that are specific to pregaming that are not assessed by the DMQ-R or the M-DMQ-R. For example, university students might pregame because they will have limited or no access to alcohol at their next destination and/or they believe that drinking before going to their next event will increase their odds of meeting or "hooking up" with a potential dating partner. To better assess these motives that are unique to the pregaming context, LaBrie et al. (2012) developed the Prepartying Motives Inventory (PMI). The PMI measures four distinct pregaming motives: interpersonal enhancement (e.g., to make it easier to talk to new people), situational control (e.g., to have control over the type of alcohol consumed), intimate pursuit (e.g., to meet potential dating/sexual partners), and barriers to consumption (e.g., limited/no access to alcohol or to avoid getting caught with alcohol at the next destination). LaBrie et al. (2012) found that all four pregaming motives, but not general drinking motives, were positively associated with pregaming behaviors (pregaming frequency/drink consumption). Thus, focusing strictly on general drinking motives limits our understanding of who is most at risk for pregaming and negative alcohol consequences.

Since the development of the PMI, other studies have also found correlations between the PMI subscales and pregaming behaviors, though specific patterns of associations differ across studies. For example, among undergraduate students in Australia, Caudwell and Hagger (2014) found that barriers to consumption and interpersonal enhancement were positively associated with pregaming drink consumption and negative alcohol consequences, while situational control was negatively related to both drinking outcomes, and intimate pursuit was not correlated with either outcome. In their study with university students in the U.S., Napper et al. (2015) found that all four pregaming motives were positively associated with negative drinking consequences from pregaming, even after controlling for general drinking motives. In another study, the four pregaming motives were also positively correlated with the number of alcoholic beverages consumed while pregaming among university students in the U.S., even after accounting for general drinking motives (Montes et al., 2016). In a recent study, Walukevich-Dienst et al. (2022) specifically examined interpersonal enhancement and intimate pursuit and found that both motives were positively associated with pregaming consumption and negative consequences among U.S. students. O'Neil et al.'s (2016) study with undergraduate students in Canada indicated that, with the exception of situational control, the PMI subscales were positively associated with many pregaming behaviors (e.g., frequency, quantity, and/or intoxication) assessed in their study. Finally, multivariate findings from Howard et al.'s (2019) study with university students in the U.K. indicated that higher endorsement of interpersonal enhancement was associated with more frequent pregaming.

While these studies have greatly furthered our knowledge of pregaming motives and behaviors, they are limited in part because analyses in most studies did not control for general drinking motives (except Montes et al., 2016 and Napper et al., 2015). As such, the utility of pregaming-specific motives in predicting pregaming behaviors above and beyond general drinking motives remains in question. In addition, a number of these studies did not account for key demographics and/or drinking games participation. For example, being a female college student or a student of color (Barnett et al., 2013), membership in a Greek letter organization (e.g., Haas et al., 2013), and membership on an intercollegiate athletic team (Mastroleo et al., 2019) have all been shown to be risk factors for pregaming. University students also report playing drinking games while pregaming (Read et al., 2010; Walukevich-Dienst et al., 2022), and research suggests that simultaneous participation in both activities can increase students' risk for elevated alcohol consumption (Hummer et al., 2013). Furthermore, the existing studies present conflicting findings [e.g., situational control motives have been positively (LaBrie et al., 2012), negatively (Caudwell and Hagger, 2014), and not (O'Neil et al., 2016) associated with pregaming behaviors] that suggest further research is needed to clarify the associations between pregaming motives and behaviors. Given that the bulk of the research on the PMI and pregaming behaviors was conducted at one or two university sites, we advanced this work by examining how motives specific to pregaming are uniquely associated with pregaming behaviors and negative alcohol consequences with a large multisite sample of U.S. college students reporting past-month pregaming while also accounting for key covariates in our analyses. Based on prior research with university students in the U.S. and to a certain extent, previous studies conducted with university students outside the U.S., we hypothesized all PMI subscales would be positively associated with pregaming behaviors (frequency/quantity) and negative alcohol consequences in general.

2. Materials and method

2.1. Participants and procedures

To maximize sample size and representativeness, participant data for the present study were drawn from two large national studies (n=30,389) conducted in the U.S.: the College Athlete Risky Drinking Study (CARDS: e.g., Zamboanga et al., 2022) and the Acculturation and

Substance Use Research Team (ASURT). In both studies, participants completed a self-report questionnaire including measures of their alcohol use attitudes and behaviors. CARDS was conducted during the 2017–2018 academic year and included National Collegiate Athletic Association Division I, II, and III student-athletes who, after completing baseline measures used in the present study, participated in *myPlaybook*, an online alcohol/substance use prevention program (Wyrick et al., 2014). No compensation was provided. The ASURT study included participants recruited from psychology subject pools, psychology or related courses, and email announcements across 12 universities during the 2018 spring and fall and 2019 spring semesters. ASURT participants were compensated with research credits, extra credit, or raffles. Procedures for ASURT were approved by respective institutional review boards (IRBs) and procedures for CARDS were approved by the principal investigator's IRB. From the combined sample, participants who did not endorse past month pregaming (n=18,936) and those who failed one or more attention check items (n=1253) were removed from the sample, leaving 10,200 participants (63% from CARDS) across 119 colleges/universities (88% from CARDS) for the current analyses (see Table 1 for sample descriptive data and Cronbach's alphas for study measures).

2.2. Measures

2.2.1. Pregaming behaviors

Pregaming behaviors were measured using two items (LaBrie et al., 2012). Frequency was assessed with the single item "In the past 30 days, how many days did you engage in pregaming?" with responses ranging from 1 to 30 in this sample of participants who pregamed (i.e., those reporting 0 were not included in analyses). Pregaming quantity was measured with the item "On the days you engaged in pregaming during the past month, on average, how many drinks[2] did you consume?" with response options 1 or 2, 3 or 4, 5 or 6, 7–9, and 10 or more (coded 0–4, respectively).[3]

2.2.2. Negative alcohol consequences

Past-month consequences were assessed with the 24-item Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ, Kahler et al., 2008; e.g., taken foolish risks, passed out, done impulsive things). Participants indicate yes or no for each item, and a sum score represents total number of different consequences reported.

2.2.3. Pregaming motives

Motives for pregaming were assessed with the Prepartying Motives Inventory (PMI; LaBrie et al., 2012). Participants reported how often they pregame for 16 reasons across four subscales: interpersonal enhancement (e.g., "to pump myself up to go out"), situational control (e.g., "so I don't have to drink at the place where I am going"), intimate pursuit (e.g., "to increase the likelihood of hooking up"), and barriers to consumption (e.g., "because I am underage and cannot purchase alcohol at the destination venue"). Items are answered with a 5-point response scale (1=*almost never/never* to 5=*almost always/always*). Mean scores were computed for each subscale.

2.2.4. Covariates

General drinking motives were measured with the 28-item Modified Drinking Motives Questionnaire-Revised (M-DMQ-R; Grant et al., 2007) which includes five subscales to assess drinking motives: enhancement, social, conformity, coping-depression, and coping-anxiety. Response options and coding are identical to those of the PMI. Other covariates included participants' self-reported demographics [age, sex, Greek affiliation, athlete status (varsity, recreational, non-athlete), and race/ethnicity], general drinking frequency and quantity (when predicting negative alcohol consequences), and frequency of drinking games participation. To create variables for general drinking frequency and quantity that could be applied within both samples, response options were collapsed across those provided via a weekly grid modified after the Daily Drinking Questionnaire (Collins et al., 1985) used in CARDS and the Alcohol Use Disorders Identification Test-Consumption scale (Barry et al., 2015) in ASURT. A single item assessed past-month frequency of playing drinking games in both studies (0=*never*, 1=*once*, 2= *2–4x/month*, 3=*2–3x/week*, and 4=*4+times/week*; Borsari et al., 2014).

Table 1
Sample descriptives for participants across 119 colleges/universities (n=10,200).

Variable	*M*/ (*SD*) or %	Range	Cronbach's Alpha
Demographics			
Age	19.98 (1.43)	18–26	–
Female[a]	61.0%	–	–
Greek Affiliated	19.9%	–	–
Athlete Status		–	
Varsity Athlete	66.8%	–	–
Recreational Athlete	7.3%	–	–
Non-Athlete	25.8%	–	–
Racial/Ethnic Group[b]			
Asian/Asian American	3.8%	–	–
White	73.6%	–	–
Black	8.5%	–	–
Hispanic	10.7%	–	–
American Indian/Native American	0.5%	–	–
Other Race/Ethnicity	2.9%	–	–
Pregaming frequency (past month days)	3.60 (2.89)	1–13	–
Pregaming quantity (drinks)		1–30	–
1 or 2	30.4%		
3 or 4	40.7%		
5 or 6	18.7%		
7–9	6.2%		
10 or more	4.0%		
Negative Alcohol consequences	5.50 (4.51)	0–24	0.87
Pregaming motives			
Interpersonal enhancement	2.78 (1.06)	1–5	0.89
Intimate pursuit	1.53 (0.86)	1–5	0.90
Situational control	2.75 (1.05)	1–5	0.75
Barriers to consumption	2.32 (1.18)	1–5	0.81
Alcohol Use Behavior			
Drinking quantity[c]	3.06 (1.51)	0–5	–
Drinking frequency[d]	1.56 (0.68)	0–3	–
General Drinking Motives			
Social	2.97 (0.92)	1–5	0.80
Conformity	1.40 (0.67)	1–5	0.87
Enhancement	2.68 (0.93)	1–5	0.83
Coping-Depression	1.57 (0.80)	1–5	0.93
Coping-Anxiety	2.03 (0.92)	1–5	0.80

Note. [a]2 participants identified as transgender female and were recorded as female, 5 identified as transgender male and were recorded as male. An additional 16 participants reported "Other" or "Prefer not to respond," and their sex was coded as missing for analyses. [b]Native American and "Other" race/ethnicity were collapsed for analyses. [c]0=*no drinking*, 1=*1–2.9 drinks*, 2=*3–4.9 drinks*, 3=*5–6.9 drinks*, 4 =*7–9.9 drinks*, 5=*10+ drinks*. [d]0=*never*, 1=*weekly or less*, 2=*2–3 times/week*, 3=*4+ times/week*. While all participants in the sample reported lifetime alcohol use and pregaming in the past month, a minority (6.7%) indicated that they do not drink in a "typical" week. We chose to analyze all participants who reported any pregaming in the past month, even if they did not drink in a "typical" week in the past month to increase generalizability across drinking levels (including individuals who do not drink frequently).

[2] One drink=12 oz beer, 4 oz wine, 1.5 oz spirits (ASURT)/12 oz beer, 5 oz wine, 1.25 oz spirits (CARDS)

[3] In CARDs, participants responded to continuous response options from 1 to 20+; these responses were collapsed into the categories used in ASURT to combine the data for analyses.

2.3. Data analytic approach

Hierarchical linear models were used to examine the associations among pregaming motives, pregaming behaviors (frequency/quantity), and negative alcohol consequences. Intraclass correlations revealed that while the majority of variance in our outcomes was at the person-level (Level 1), some was also present at the site-level (Level 2; 6%, 5% and 1% for pregaming frequency, pregaming quantity, and alcohol consequences, respectively). As such, the HLM 7.0 program was used to estimate multilevel models with participants nested within site. Three separate models were estimated, one per outcome. Skewness and kurtosis were not evident in any of the three outcomes, so primary models were run assuming normal distributions, with Poisson distributions tested in sensitivity analyses. Primary predictors of interest were the four pregaming motives subscales. Level 1 covariates in all models included age, sex, Greek affiliation, athlete status (modeling varsity and recreational separately, with non-athlete as referent group), race/ethnicity (modeling Asian, Black, Hispanic, and other race/ethnicity separately, with White as the referent group), frequency of playing drinking games, and the five general drinking motives subscales. In the model predicting consequences, we examined effects of pregaming frequency and quantity in addition to the four pregaming motives. In this model, we also controlled for general alcohol use frequency and quantity.

For all models, Level 1 continuous variables, including motives, were person-mean centered. At Level 2, we controlled for site-level means of each pregaming motive (i.e., average of each motive, across all participants within each university). Here, motives were site-mean centered, allowing us to isolate the extent to which an individual's levels of pregaming motives (relative to others at the same university) were associated with pregaming behavior and consequences, after controlling for the extent to which pregaming motives were higher or lower on average at their own university (relative to other universities). In other words, we partitioned the variance in motives between the person- and site-levels. In all models, intercepts were random while slopes were fixed, and full maximum likelihood estimation was used to handle missing data at Level 1. Checks of model assumptions revealed that for all three models, both Level 1 and Level 2 residuals were normally distributed; however, homogeneity of variance assumptions were violated. To address this, models with robust standard errors were interpreted.

3. Results

Results of multilevel models are shown in Table 2 (which also contains information pertaining to associations between covariates and pregaming frequency/quantity and negative alcohol consequences) and described below.[4]

3.1. Pregaming frequency

Interpersonal enhancement and intimate pursuit pregaming motives were positively associated with pregaming frequency. Barriers to consumption pregaming motives were associated with lower pregaming frequency. Situational control motives were not significantly associated with pregaming frequency. These associations were observed in the context of controlling for significant positive associations for drinking game frequency and significant associations for all five general drinking motives (negative for coping-anxiety and conformity, positive for coping-depression, enhancement, and social) at the individual level, and a significant positive site-level association for intimate pursuit motives.

Table 2
Hierarchical linear models predicting pregaming behavior and negative alcohol consequences (n=10,200).

	Pregaming Frequency		Pregaming Quantity		Negative Alcohol Consequences	
	B	*p*	B	*p*	B	*p*
Intercept	4.98	<0.001	0.93	<0.001	5.82	<0.001
Pregaming motives						
Interpersonal Enhancement	**0.20**	**<0.001**	**0.07**	**<0.001**	**0.43**	**<0.001**
Situational Control	-0.03	0.429	**-0.06**	**<0.001**	**-0.32**	**<0.001**
Intimate Pursuit	**0.27**	**<0.001**	**0.07**	**<0.001**	**0.17**	**0.020**
Barriers to Consumption	**-0.17**	**<0.001**	0.01	0.274	**0.13**	**0.006**
Level 1 Covariates						
Age	-0.00	0.888	0.02	0.043	0.25	<0.001
Male Sex (ref=Female)	-0.23	0.013	0.53	<0.001	-0.34	0.001
Greek Affiliated (ref=Not Affiliated)	-0.77	<0.001	-0.03	0.385	-0.16	0.151
Asian (ref=White)	-0.35	0.025	-0.07	0.244	0.18	0.486
Black (ref=White)	0.05	0.630	0.00	0.911	-0.50	<0.001
Hispanic (ref =White)	-0.09	0.384	-0.09	0.048	0.13	0.316
Other race (ref=White)	-0.17	0.202	0.12	0.063	0.18	0.447
Varsity Athlete (ref=non-Athlete)	-0.12	0.502	0.14	0.021	0.22	0.149
Recreational Athlete (ref=Non-Athlete)	-0.25	0.058	-0.12	0.001	-0.07	0.576
Drinking Game Frequency	1.29	<0.001	0.20	<0.001	0.26	<0.001
General Social Motives	0.16	<0.001	0.00	0.833	0.31	<0.001
General Coping-Depression Motives	0.17	0.013	0.08	0.007	1.12	<0.001
General Coping-Anxiety Motives	-0.21	<0.001	-0.08	<0.001	-0.07	0.355
General Enhancement Motives	0.35	<0.001	0.16	<0.001	0.27	<0.001
General Conformity Motives	-0.21	<0.001	-0.06	0.003	0.29	<0.001
Pregaming Frequency	–	–	–	–	**0.25**	**<0.001**
Pregaming Quantity	–	–	–	–	**0.34**	**<0.001**
General Drinking Quantity	–	–	–	–	0.26	<0.001
General Drinking Frequency	–	–	–	–	0.46	<0.001
Level 2 Covariates						
Site-level Interpersonal Enhancement	0.51	0.270	0.03	0.858	1.36	0.007
Site-level Situational Control	0.37	0.261	-0.15	0.101	-0.29	0.440
Site-level Intimate Pursuit	1.43	0.016	0.27	0.179	1.24	0.032
Site-level Barriers to Consumption	0.32	0.174	-0.04	0.606	0.19	0.533

Note: **Bold** indicates significant associations of interest in the present study. ref=referent group.

3.2. Pregaming quantity

Similar to pregaming frequency, interpersonal enhancement and intimate pursuit pregaming motives were positively associated with quantity of alcohol consumed while pregaming. Situational control pregaming motives were associated with lower quantity of alcohol

[4] One alternative set of models was run assuming Poisson distributions, and a second alternative set of models was run without inclusion of site-level means of each pregaming motive at Level 2. Across these alternative models, significance levels of pregaming motives did not differ from those presented in the results.

consumed while pregaming. Barriers to consumption motives were not significantly associated with pregaming quantity. These associations were observed in the context of controlling for significant positive associations for drinking game frequency, and significant associations for four of five general drinking motives (positive for coping-depression and enhancement; negative for coping-anxiety and conformity) at the individual level. Site-level pregaming motives were non-significant.

3.3. Negative alcohol consequences

Pregaming frequency, pregaming quantity, and three of four pregaming motives (interpersonal enhancement, intimate pursuit, and barriers to consumption) were significantly positively associated with negative alcohol consequences, while situational control motives for pregaming[5] were significantly negatively associated with negative alcohol consequences. These associations were observed in the context of controls for significant positive associations for drinking game frequency, general drinking quantity, general drinking frequency, and four of five general drinking motives (social, coping-depression, enhancement, and conformity) at the individual level, as well as significant positive site-level associations for interpersonal enhancement and intimate pursuit motives.

4. Discussion

The purpose of the present study was to investigate how certain pregaming motives are related to pregaming frequency, pregaming drink quantity, and negative alcohol consequences. Prior studies that examined how certain motives for pregaming (as measured by the PMI) relate to pregaming behaviors may be limited by (a) lack of adjustment for general drinking motives, (b) exclusion of key demographic (e.g., sex, athlete status, race/ethnicity) correlates of pregaming and drinking games participation, and (c) tenuous generalizability given data were collected at just one or two university sites. The present study addresses these limitations and was conducted with a pooled national sample of university students in the U.S. We found partial support for our hypothesis that pregaming motives would be positively associated with our outcome variables. The motive that was most robustly associated with pregaming outcomes was interpersonal enhancement. Specifically, as hypothesized and as indicated in prior research, interpersonal enhancement motives were positively associated with pregaming frequency (Canada: O'Neil et al., 2016; U.K.: Howard et al., 2019; U.S.: LaBrie et al., 2012), pregaming quantity (Australia: Caudwell and Hagger, 2014; Canada: O'Neil et al., 2016; U.S.: LaBrie et al., 2012; Montes et al., 2016; Walukevich-Dienst et al., 2022), and negative alcohol consequences (Australia: Caudwell and Hagger, 2014; U.S.: Napper et al., 2015; Walukevich-Dienst et al., 2022). That is, students who indicate that they are motivated to pregame to make the night more interesting and/or to make it easier to talk to new people may pregame more often and in higher quantities, which may also put them at increased risk for negative outcomes related to drinking. Importantly, we extend prior work by demonstrating this finding (and all others) while accounting for several key covariates using a national sample of university students across 119 institutions in the U.S.

Also, as expected, and consistent with past studies, intimate pursuit motives were positively related to pregaming frequency (Canada: O'Neil et al., 2016; U.S.: LaBrie et al., 2012), pregaming drink quantity (Canada: O'Neil et al., 2016; U.S.: LaBrie et al., 2012, Montes et al., 2016; Walukevich-Dienst et al., 2022), and negative alcohol consequences (U.S.: Napper et al., 2015; Walukevich-Dienst et al., 2022). In other words, those who are driven to pregame to meet potential dating partners or to "hook up" are also at increased risk for frequent, heavy, and consequential pregaming. Of note, multivariate findings from prior studies with university students (Australia: Caudwell and Hagger, 2014; U.K.: Howard et al., 2019) found no associations between intimate pursuit motives and pregaming behaviors or negative drinking consequences. This discrepancy could be due to differences in cultural norms and practices in approaches to intimate pursuits between university students in the U.S. and Australia and the U.K., methodological differences in the studies (e.g., different covariates) or some combination of the two.

As hypothesized, higher endorsement of barriers to consumption motives was associated with more negative alcohol consequences; this finding aligns with prior research conducted with university students in the U.S. (Napper et al., 2015) and Australia (Caudwell and Hagger, 2014). Together, these studies indicate that those motivated to pregame because alcohol may be difficult to obtain at the next event also report more negative outcomes related to drinking in general. Further research is needed to better understand why this may be the case. Interestingly, the positive association between higher endorsement of barriers to consumption motives and negative alcohol consequences does not seem to be associated with an increased quantity of drinking while pregaming. Contrary to our hypothesis and prior research with university students from Australia (Caudwell and Hagger, 2014) and the U.S. (LaBrie et al., 2012; Montes et al., 2016), but consistent with research conducted with university students in the U.K. (Howard et al., 2019) and Canada (O'Neil et al., 2016), barriers to consumption motives were not significantly associated with pregaming drink quantity specifically. While barriers to consumption may increase pregaming drink quantity for some students or in certain situations (e.g., desire to get drunk enough to get through a social event where there is limited or no access to alcohol), it is possible that students who endorse this motive could also be more mindful of the amount of pregaming drinks they consume in other contexts (e.g., since showing up intoxicated at certain venues could get one into trouble). Future research could examine person-level and/or contextual-level moderators of the barriers to consumption motive association with pregaming drink quantity, such as desired levels of intoxication at the next social event or access to alcoholic beverages at the next destination. Moderators not yet identified may help explain the discrepant findings on the association between barriers to consumption pregaming motives and drink quantity across studies.

Finally, contrary to our hypothesis and prior studies conducted with U.S. university students (LaBrie et al., 2012; Montes et al., 2016; Napper et al., 2015), barriers to consumption motives were negatively associated with pregaming frequency, and situational control motives were negatively associated with pregaming quantity and negative alcohol consequences. Perhaps individuals who are concerned about only drinking certain types of alcohol, or who worry about others tampering with their drinks at the main event, may be pregaming not to facilitate rapid consumption but to consume alcohol in a controlled setting (i.e., anticipating less control in the main event) and in quantities that will allow them to maintain control throughout the evening's events. Despite negative multivariate associations, bivariate associations between barriers to consumption motives and pregaming frequency, and between situational control motives and consequences, were positive. One possibility is that the negative multivariate associations are a function of statistical suppression. It is also possible that once accounting for all other variables (especially other pregaming and general motives), situational control may be protective against alcohol consequences (perhaps

[5] Negative associations between barriers to consumption motives and pregaming frequency, and negative associations between situational control motives and both pregaming quantity and consequences were unexpected. Importantly, these associations were observed in the context of controlling for significant associations for several other variables, including drinking game frequency, general drinking motives, and other pregaming motives. The bivariate association between situational control motives and pregaming quantity was also negative ($r=-0.055$, $p<0.001$). However, the bivariate association between barriers to consumption motives and pregaming frequency was positive ($r=0.072$, $p<0.001$), as was the bivariate association between situational control motives and consequences ($r=0.052$, $p<0.001$). As such, these two particular negative associations observed in the multivariate context may reflect suppressor effects and should be interpreted tentatively.

due to lower pregaming quantity, as described above), and barriers to consumption may be protective in terms of limiting pregaming frequency. Indeed, individuals who are underage, unable to obtain alcohol easily, and/or have concerns about being caught with alcohol may be less inclined to pregame often.

4.1. Limitations, future directions, and implications

The current findings must be considered in light of several important limitations. First, the cross-sectional design precludes any inferences of causality or the temporal order of the associations between the study variables. Second, we did not assess negative alcohol consequences specific to pregaming. Third, given that we used retrospective self-report data, we cannot rule out the possibility of reporting bias. Finally, only 26.4% of our data analytic sample self-identified as a student of color or other race/ethnicity. Future research on college pregaming should include more students from diverse ethnic/racial backgrounds to enhance sample representativeness, and examine differences across racial/ethnic groups (Paves et al., 2012). Despite these study limitations, our results provide insight into motivations for pregaming, which are likely malleable cognitions, and can therefore serve as one potential target for intervention. The two pregaming motives that increased risk for more frequent pregaming, drinking consumption while pregaming, and negative alcohol consequences – interpersonal enhancement and intimate pursuit – as well as the additional motive that increased risk for negative alcohol consequences – barriers to consumption – may be most important to address. Future work should be conducted to determine how best to target these motivations in the context of interventions. Given the global prevalence of pregaming (e.g., Labhart et al., 2017; Zamboanga et al., 2023) and its link to increased alcohol consumption and risk for negative alcohol consequences (Foster and Ferguson, 2014), there continues to be a need for pregaming research and intervention efforts that specifically target pregaming motives and behaviors. We hope that the present study will inspire researchers in the U.S. and other parts of the world to continue their scholastic efforts to address this risky drinking practice, particularly among university students, including those from diverse backgrounds.

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CRediT authorship contribution statement

Prof. Byron L. Zamboanga designed and conceptualized the study, conceptualized the statistical analyses, and wrote the initial drafts of the manuscript. Dr. Jennifer E. Merrill conceptualized and conducted the statistical analyses, wrote the initial drafts of the method, results, and tables/figures, and contributed to manuscript writing. Dr. Amie R. Newins contributed to the conceptualization of the statistical analyses, manuscript writing, and collected data for the study. Dr. Janine V. Olthuis and Dr. Kathryne Van Hedger contributed to manuscript writing. Dr. Heidemarie Blumenthal, Prof. Su Yeong Kim, Dr. Timothy J. Grigsby, Dr. Jessica K. Perrotte, Dr. P. Priscilla Lui, and Dr. Dennis McChargue provided editorial feedback and collected data for the study. Prof. Zamboanga and Dr. Merrill contributed equally to this manuscript. All authors approved the submission of this manuscript.

Declaration of Competing Interest

The authors have no conflicts of interest to declare.

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