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Does a Brief Motivational Intervention Reduce Frequency of Pregaming in Mandated Students?

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Abstract

Background—Pregaming, also known as frontloading or predrinking, is a common but risky drinking behavior among college students. However, little is known about the way in which a brief motivational intervention (BMI) addressing general alcohol use and consequences may impact pregaming frequency.

Objectives—This study examined whether mandated students reduced frequency of pregaming following a BMI when pregaming was spontaneously discussed and whether gender moderated these effects.

Methods—Participants (n = 269, 32% female) were mandated college students who had received a campus-based alcohol citation and continued to exhibit risky alcohol use six weeks after receiving a brief advice session. Participants were randomized to a brief motivational intervention (BMI, n = 145) or assessment only (AO, n = 124) and completed follow-up assessments at 3, 6, and 9 months postintervention. Hierarchical Linear Modeling (HLM) was used to examine both between-person (Level 2) effects (i.e., condition) and within-person (Level 1) effects (i.e., time) on pregaming frequency. Analyses examining discussions of pregaming within the BMI were conducted using a sub-sample of the BMI sessions which had been transcribed (n = 121).

Results—Participants in the BMI group did not significantly reduce the frequency of pregaming compared to those in the AO group, even when pregaming was explicitly discussed during the BMI. Moreover, the BMI was equally ineffective at reducing pregaming frequency for both males and females.

Conclusion/Importance—Pregaming frequency appears to be resistant to conventional intervention efforts, but recent research suggests several innovative strategies for addressing pregaming in the college student population.

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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; brief intervention; alcohol; college students; mandated

Pregaming (sometimes called “preloading” or “prepartying”) is defined as consuming alcohol prior to attending a social event, where additional alcohol may or may not be available and/or consumed (Borsari et al., 2007; Pedersen & LaBrie, 2007; Read, Merrill, & Bytschkow, 2010; Wells, Graham, & Purcell, 2009). Pregaming is a common practice on U.S. college campuses, reported by 70–75% of drinkers (Barnett, Orchowski, Read, & Kahler, 2013; DeJong, DeRicco, & Schneider, 2010; Hummer, Napper, Ehret, & LaBrie, 2013; Pedersen & LaBrie, 2007; Pedersen & LaBrie, 2008; Read et al., 2010), and high rates of pregaming have been observed at colleges and universities across regions of the United States (Barnett et al., 2013; Borsari et al., 2007; DeJong et al., 2010; Glindemann, Ehrhart, Maynard, & Geller, 2006; Hummer et al., 2013; LaBrie & Pedersen, 2008; Napper, Kenney, Montes, Lewis, & LaBrie, 2015; Pedersen & LaBrie, 2007; Read et al., 2010; Zamboanga, Schwartz, Ham, Borsari, & Van Tyne, 2010). Students engage in pregaming frequently – on about one third of days on which they drink (Barnett et al., 2013; Fairlie, Maggs, & Lanza, 2015; Labhart, Graham, Wells, & Kuntsche, 2013; Read et al., 2010).

Of particular concern is the amount of alcohol consumed during a pregaming episode. The duration of the pregaming period is limited due to the need to leave for the primary event, and it often occurs in contexts without serving restraints and other social controls (e.g., dorm room vs. bar); thus, a pregaming episode commonly involves drinking large quantities of alcohol in a compressed time period (DeJong et al., 2010). Intoxication is often the *goal* for students who report pregaming; indeed, a top reason students cite for pregaming is “to get buzzed before going to the event” (Bachrach, Merrill, Bytschkow, & Read, 2012). Students typically consume 2–6 drinks while pregaming (DeJong et al., 2010; LaBrie, Grant, & Hummer, 2011; LaBrie & Pedersen, 2008; Pedersen & LaBrie, 2007; Read et al., 2010), and they do so quickly (50% less than 1 hour, 90% less than 2 hours; Pedersen & LaBrie, 2007). Moreover, drinking often continues at the main social event (DeJong et al., 2010; Pedersen & LaBrie, 2007), further increasing personal intoxication and risk for alcohol-related consequences.

Given the rapid rates of heavy drinking that can occur during pregaming, it is not surprising that it has been linked to higher numbers of alcohol-related consequences (Kenney, Hummer, & Labrie, 2010; Kuntsche & Labhart, 2013; LaBrie & Pedersen, 2008; Paves, Pedersen, Hummer, & LaBrie, 2012; Pedersen, LaBrie, & Kilmer, 2009), including neglecting responsibilities, feeling sick, passing out, absenteeism at school/work, drunk driving, alcohol poisoning, aggressive or violent acts, blackouts (i.e., temporary periods of memory loss during drinking), and hospitalization (Ahmed, Hustad, Lasalle, & Borsari, 2014; DeJong et al., 2010; Hughes, Anderson, Morleo, & Bellis, 2008; LaBrie, Hummer, Kenney, Lac, & Pedersen, 2011; LaBrie & Pedersen, 2008; Pedersen & LaBrie, 2007; Pedersen et al., 2009). Daily and event-level data show that adverse outcomes occur more often (Labhart et al., 2013) and in greater numbers (Merrill, Vermont, Bachrach, & Read, 2013) on evenings when pregaming occurs.

Pregaming and other risky drinking practices have drawn the attention of college administrators and researchers. A growing body of intervention research provides evidence that brief alcohol interventions tailored to college students can reduce consumption and alcohol-related consequences (Carey, Scott-Sheldon, Elliott, Garey, & Carey, 2012; Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Cronce & Larimer, 2011), both in the general student population and among students sanctioned because of violations of campus alcohol policy. In particular, brief motivational interventions (BMIs) are among the most effective methods of reducing alcohol use and/or problems in mandated students (Borsari & Carey, 2005; Carey, Carey, Henson, Maisto, & DeMartini, 2011; Carey, Henson, Carey, & Maisto, 2009). BMIs are commonly delivered in 1–2 individual meetings (one-on-one), are approximately 50 minutes long (Carey et al., 2007), and use a motivational interviewing approach (e.g., Miller & Rollnick, 2012) to reduce heavy drinking. However, to date, the efficacy of BMIs has been measured with respect to global drinking outcomes (e.g., frequency of alcohol use in past month, drinks per week) as well as specific risky drinking practices (e.g., heavy episodic drinking) that were addressed in the context of the intervention (Carey et al., 2007). The impact of BMI interventions addressing general alcohol use and consequences on the specific high-risk practice of pregaming has yet to be examined.

This study examined a subset of data from a larger trial implementing BMIs with mandated college students (Borsari, Hustad, Mastroleo, O'Leary Tevyaw, Barnett, et al., 2012). During the trial, several students reported pregaming when describing the incident that led to their referrals. Therefore, measurement of the practice of pregaming was added to the assessment battery in the second year of the trial, providing the opportunity to examine hypotheses regarding the impact of the BMI on pregaming frequency. First, given the highly motivated and context-specific nature of pregaming (Bachrach et al., 2012; LaBrie, Hummer, Pedersen, Lac, & Chithambo, 2012) and the lack of reductions in alcohol use (both frequency as well as heavy episodic drinking) following the BMI in the parent trial, we hypothesized a BMI addressing alcohol use and consequences would not facilitate reductions in the frequency of pregaming compared to an assessment only control group. Second, to further examine whether BMIs addressing general alcohol use and consequences can differentially influence pregaming, we examined transcripts of the BMI sessions to determine whether pregaming was spontaneously mentioned by the student and specifically addressed by the interventionist. As BMIs that are more personalized appear to be more effective (Ray et al., 2014), we hypothesized that BMIs in which pregaming was explicitly discussed would result in reductions in pregaming frequency relative to BMIs that did not address pregaming.

Finally, while some research has not detected any gender differences in pregaming frequency (Borsari et al., 2007; DeJong et al., 2010; LaBrie & Pedersen, 2008; Merrill et al., 2013; Pedersen & LaBrie, 2007; Pedersen et al., 2009; Read et al., 2010; Reed et al., 2011), other research has observed that men pregame more often than women (Bachrach et al., 2012) or women pregame more than men (Zamboanga et al., 2013), and a recent study found that women are significantly more likely than men to report pregaming on drinking days (Barnett et al., 2013). This inconsistency regarding the importance of gender in the frequency of pregaming justifies the inclusion of gender in predictive models. In addition to potential gender differences in pregaming behavior, it is possible that women or men

differentially reduce their frequency of pregaming as a result of a BMI. For example, prior research demonstrates that college women may be more likely to consider changing their drinking behavior than college men upon being mandated for treatment (Barnett, Goldstein, Murphy, Colby, & Monti, 2006) and women are more likely to use protective behavioral strategies to reduce alcohol-related harm when prompted to do so (Benton et al., 2004; Walters, Roudsari, Vader, & Harris, 2007). Thus, an examination of gender as a moderator of post-BMI change in pregaming frequency allows for ascertainment of whether any effect (or lack of effect) is driven only by one gender or the other. Though we did not have a *priori* hypotheses, we conducted an exploratory examination of whether gender served as a moderator of the hypothesized associations between treatment and pregaming frequency and between discussion of pregaming during the BMI and pregaming frequency. These analyses therefore permitted us to rule out the possibility that a null effect of the BMI on pregaming frequency could be explained by differential responding of males versus females (i.e., that there really is an effect for one gender and not the other).

Materials and methods

Design

The data used in this study was from a larger trial implementing stepped care with mandated college students at a four-year, private liberal arts university in the Northeast US (Borsari et al., 2012). Interventions were delivered in two steps. First, following completion of the baseline assessment, all participants initially received a 15-minute Brief Advice (BA) session (Step 1). Six weeks following this session, participants completed a web-based assessment. Participants who reported continued risky alcohol use (defined as four or more heavy drinking episodes and/or reporting five or more alcohol-related problems in the past month) during the 6 weeks since the BA were randomized to (a) Step 2 intervention, a 60-minute or less BMI or (b) an assessment only control condition (AO). Web-based assessments at 3, 6, and 9 months revealed that the BMI group reduced alcohol-related consequences significantly more than the AO group, but the BMI and AO groups did not differ in alcohol use (heavy episodic drinking, peak estimated Blood Alcohol Content) in parent trial.

Participants and recruitment

Participants (n = 269) were undergraduate students age 18 years and older who violated campus alcohol policy. Recruitment took place during the school year (September to May) from 2006– 2009. Students who declined to participate in the project received treatment as usual: a 15–30 minute individual discussion of their referral incident and alcohol use, and a subsequent 60-minute individual counseling session if they committed another alcohol-related infraction during the school year. As the follow-up assessments were completed using web-based surveys, all potential participants were provided detailed information regarding procedures implemented to protect the security of their responses. Students were told they would receive $15 for the baseline assessment; $40 for the 6-week assessment; and 25, 35, and $60 for the 3-, 6- and 9-month assessments, respectively. Participants provided informed consent, and the university Institutional Review Board of the study site approved all procedures.

Measures

Participants provided demographic information regarding their gender, age, weight, year in school, and race/ethnicity. Alcohol use outcome variables were obtained using the *Alcohol and Drug Use Measure* (Borsari & Carey, 2005). Frequency of heavy episodic drinking (HED) was obtained using a gender-specific question that asked participants to report the number of times they consumed five or more drinks for males (4+ for females) in one sitting in the past month. This measure also recorded the number of drinks consumed during a peak episode (i.e., the maximum number of drinks), as well as the amount of time spent drinking for each of those episodes to calculate the students' estimated peak blood alcohol concentration (pBAC). Drinking frequency was the number of occasions the participant consumed alcohol in the past 30 days. Participants were also asked to estimate the number of times they pregamed in the past month, defined as: "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)."

Discussion of pregaming during the BMI—To detect whether pregaming was discussed during the session, we examined 90 transcripts of the BMI sessions that had been generated for another project (citation removed). Specifically, transcripts were searched for the terms "pregaming," "frontloading," and "prepartying." The context of these terms was then examined. In order to determine if pregaming was discussed during the BMI, the session had to include at least two utterances about pregaming (an utterance is defined as a complete thought; Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003). In the current study, this consisted of the interventionist providing general information regarding the risks associated with the behavior ("if you were to just drink at the beginning of the night, pregame if you will, and have [your blood alcohol level] spike, then head out. It's a lot different [than typical consumption]") **and** the participant endorsing or describing pregaming ("probably doing like, shots like, a couple like at a time, within you know a half hour, which I have done before but not as much …I think just having a lot within a two hour period, maybe having like six or something"). Because the participants' discussion of pregaming during the sessions was cursory, never exceeding two participant utterances, we created a dichotomous measure of pregaming discussion (discussed/not discussed).

Interventions

Brief advice—BA sessions typically occurred within 2 weeks of the referral incident. All participants received a BA session administered by peer counselors (fellow undergraduate students) who facilitated discussion of the events leading to the referral incident and any changes the student had made to his or her drinking as a result. The participant was then provided with a 12-page educational booklet on alcohol use and associated risks (adapted from Cunningham, Wild, Bondy, & Lin, 2001). Pregaming was not explicitly addressed during this intervention, although it may have been discussed in the context of the referral incident. The BA session took approximately 15 minutes.

Brief motivational intervention (BMI)—The BMI implemented has significantly reduced alcohol use and problems with mandated and non-mandated students in other trials (Borsari & Carey, 2000, 2005; Carey et al., 2009; Hustad, Mastroleo, Kong, Urwin, Zeman, LaSalle, & Borsari, 2014; Wood, Fairlie, Fernandez, Borsari, Capone, Laforge, & Barros, 2010). The BMIs were delivered by three master's-level and doctoral-level professional clinicians. During the intervention, the interventionists used motivational interviewing skills while reviewing topics on the feedback form, which covered normative quantity/frequency of drinking, BAC and tolerance, alcohol-related consequences, influence of setting on drinking, and alcohol expectancies. The BMI lasted approximately 45–60 minutes, and 121 out of 145 BMI sessions (83%) were tape recorded (the other sessions were not recorded due to equipment failure). Fidelity assessments in the parent trial and subsequent examination of in-session processes have demonstrated that these BMIs were delivered with high levels of fidelity (Borsari, Apodaca, Jackson, Magill, Mastroleo, Barnett & Carey, 2015).

Follow-up assessments

Participants received telephone and/or email reminders to complete web-based follow-up assessments. Of the 269 participants who were assigned to BMI or AO, 247 (92%) participants completed the 3-month follow-up; 243 (90%) participants completed the 6-month assessment; and 250 (93%) participants completed their 9-month assessment. Eighty four percent of participants (n = 227) completed all four assessments, 9% (n = 23) completed three, 3% (n = 9) completed two, and 4% (n = 10) completed just one. Attrition analyses using chi-square tests revealed no differences in the number of missed assessments by condition (BMI, AO), gender, race, or year in school. Pearson correlations revealed no association between number of missed assessments and frequency of pregaming or drinking in general at the 6-week assessment prior to randomization to BMI or AO conditions.

Data analytic plan

First, we examined variable descriptives, including mean pregaming frequency at each time point separately within condition (BMI, AO). Next, the HLM 7.01 program (Raudenbush, Bryk, & Congdon, 2013) was used to conduct hierarchical linear modeling (HLM). HLM was appropriate as our data were nested within participants across time, and given our interest in both between-person (Level 2) effects (i.e., condition, presence of pregaming discussion) and within-person (Level 1) effects (i.e., time, drinking frequency) on our outcome of pregaming frequency.

HLM analyses began with a screen for missing data. An advantage of HLM is its flexibility in handling missing data at the within-person level, allowing us to retain for analysis any participant that contributed at least one assessment. The person-period data set for full sample analyses was represented by 1076 observations (n = 269 participants*4 assessments). Across participants, data were missing due to failure to complete surveys on a total of 78 out of 1076 assessments (7%). Distributions of pregaming and regular drinking frequency were examined, and 15 outliers falling 3 standard deviations above the mean were recoded to the highest non-outlying value plus 1 (Tabachnick & Fidell, 2007). For pregaming frequency, we recoded three nonsensical past month values (40, 45, 80) to missing. Homogeneity of variance assumptions were not violated in any reported model.

Fully unconditional HLM models (i.e., no predictors) were run first, in order to determine intraclass correlations (ICCs) for pregaming frequency. ICCs provided information on the percentage of variation in pregaming frequency at both the between- and within-person level. A piecewise growth model was then used to examine the impact of receiving a BMI on pregaming frequency, with two time components included at Level 1. The first was coded (0, 1, 1, 1), in order to estimate the impact of condition on initial change in pregaming frequency from the 6-week assessment (prior to randomization to BMI or AO) to the 3 month follow-up. The second was coded (0, 0, 1, 2), in order to estimate the impact of BMI/AO condition on the slope of pregaming frequency across the course of the 3, 6, and 9 month follow-ups (change across follow-ups).We also included a time-varying effect of regular drinking frequency, in order to test whether pregaming was reduced as a function of intervention, above and beyond general drinking behavior.

A second piecewise growth model, only among BMI participants for whom we were able to code transcripts (n = 121 out of 145 BMI sessions; 83%), was then estimated in order to examine the impact of discussing pregaming within the BMI on pregaming frequency. Time was specified as described above. We used full maximum likelihood estimation, and all intercepts and slopes were initially specified as random in order to account for individual variation in both baseline levels of pregaming and time-varying associations. However, variance in the effect representing the initial intervention response was non-significant in both the full sample and BMI only sample models and was therefore fixed for more parsimonious final models.

In two additional exploratory models parallel to those described above, we added tests of gender as a moderator of the effects of (a) BMI versus AO, and (b) whether or not pregaming was discussed during the BMI. The interaction was regressed on the intercept and both time effects, and interaction testing followed recommendations of Aiken and West (1991).

Results

Descriptives

Sample descriptives are included in Table 1. Mean pregaming frequency at each time point is depicted in Table 2 by condition (BMI, AO). In the full sample, the ICC was .51, indicating 51% of the variance in pregaming over time is due to the way in which individuals differ from one another, while 49% due to within-person changes over time. Among those participants who received the BMI, the ICC was .39, indicating that 39% of the variance in pregaming over time is due to the way individuals differ from one another and 61% due to how they differ from self over time. In both cases, a two-level model is appropriate.

Effects of condition on pregaming frequency

Results of the model predicting pregaming frequency in the full sample, by condition, are displayed in Table 3. A significant time-varying effect of regular drinking frequency on pregaming frequency was covaried. On average, across both BMI and AO participants, there was no significant change in pregaming frequency from baseline to first follow-up (initial

response), and no significant linear effect of pregaming frequency across all three follow-ups. In addition, condition (BMI vs. AO) did not significantly predict the intercept of pregaming (baseline levels), initial response, or the slope across follow-ups.

In the parent study, with a larger sample, the BMI did not have a significant effect on HED and pBAC, while it did result in downward change in consequences. In order to examine whether change in general drinking behavior was observed in the subset of participants used here, we ran post-hoc models predicting consumption outcomes. Here again, we saw that the BMI versus AO was associated with lower levels of consequences on average across all participants and all assessments. In this smaller sub-sample, the BMI was also associated with lower levels of HED and pBAC between the baseline (6-week assessment) and first follow-up (3 month assessment), but not regular drinking frequency. The BMI did not impact the subsequent rate of change in any drinking index across follow-ups. Together, these findings suggest that the traditional BMI has a positive impact on reducing alcohol consumption among these participants, but produced no risk reduction on frequency of the specific practice of pregaming.

Effects of pregaming discussions during BMI on pregaming frequency

Among participants for whom we had session transcripts, 30 participants did spontaneously discuss pregaming during the BMI and 60 participants did not. Results of the model predicting pregaming frequency among BMI participants by discussion of pregaming in the intervention are displayed in Table 4 . Again, a significant time-varying effect of regular drinking frequency on pregaming frequency was covaried. Among this subset of participants, we again observed no significant change in pregaming frequency from the 6-week assessment to first follow-up (initial response), and no significant linear effect of pregaming frequency across all three follow-ups. In addition, pregaming discussions did not significantly predict the intercept of pregaming (baseline levels), initial response, or the slope across follow-ups.

Exploratory tests of gender moderation

Gender did not significantly moderate the effect of BMI versus AO on the intercept or slopes of pregaming frequency. Gender also did not significantly moderate the effect of BMI pregaming discussion on the intercept or slopes of pregaming frequency (all $p > .10$). Additionally, there was no main effect of gender on pregaming frequency, and inclusion of gender and the interaction terms did not alter other effects in the models. For parsimony, Tables 3 and 4 present models without these additional effects.

Discussion

The present study is, to our knowledge, the first to examine whether a traditional BMI targeting drinking behavior among college students is effective in reducing the frequency of pregaming. Findings revealed that a traditional BMI does not decrease the number of times that mandated students pregame per month, even when pregaming was discussed during the intervention. Further, a traditional BMI appeared to be equally ineffective in producing a downward change in pregaming frequency for both male and female students. In the larger

context of the parent trial, the traditional BMI reduced alcohol-related consequences, but such risk reduction did not occur through less frequent drinking or less frequent pregaming in particular.

Fortunately, a recent integrated data analysis (IDA; Ray et al., 2014) of 24 independent trials administering BMIs to over 6,000 college students (18% mandated) may provide a possible explanation. Specifically, reductions in alcohol use at longer term-follow-ups (6–12 months) were greater following BMIs that either (a) provided highly personalized information on a large number of topics or (b) provided more generic information on a fewer number of topics. Thus, there appears to be an interaction between the number of topics addressed in the BMI and the degree to which the feedback was personalized to reflect the student's own situation. In the context of the current study, perhaps participants may have found a professionally delivered BMI with highly personalized feedback (which included comparison to national and campus norms, self-reported consequences) as irrelevant to pregaming, even if this was explicitly mentioned in the context of the session. Instead, pregaming appears to be very appealing to students, which is not unexpected given the monetary, physiological (inebriation, relaxation), emotional (enhancement), and social (facilitation) advantages pregaming can achieve (Bachrach et al., 2012; LaBrie et al., 2012; Read et al., 2010; Zamboanga et al., 2010).

Consistent with high-risk drinking associated with events such as 21st birthdays and Spring Break (Neighbors et al., 2011; Neighbors, Lee, Lewis, Fossos, & Walter, 2009), pregaming can be considered to be an event-specific drinking pattern that may respond to event-specific interventions. Our findings suggest that a more focused and intensive intervention is likely needed to change the frequency of this highly rewarding and planned high-risk behavior. Such event-specific prevention (Neighbors et al., 2007) can supplement universal and selective prevention efforts to reduce context-specific behaviors such as pregaming. College students consistently report consuming more drinks and achieving higher BACs on pregaming days as opposed to non-pregaming days (Barnett et al., 2013; Barry, Stellefson, Piazza-Gardner, Chaney, & Dodd, 2013; Borsari et al., 2007; Clapp et al., 2009; Glindemann et al., 2006; LaBrie & Pedersen, 2008; Pedersen & LaBrie, 2007; Read et al., 2010; Zamboanga et al., 2013). This may be due in part to college students' lack of knowledge regarding how to judge standard drinks (White et al., 2005) and, by extension, how to estimate their level of intoxication (Mallett, Turrisi, Larimer, & Mastroleo, 2009). This suggests that education about factors affecting BAC and the biphasic curve may help to sensitize some drinkers to the risk of consuming large quantities in a short time, as often is done during pregaming. As we only assessed pregaming frequency in this study, we can conclude from the current study that participants are not engaging in pregaming less frequently as a result of the BMI; however, we cannot address whether they are drinking less when they do pregame. Therefore, future studies may examine the number of drinks consumed while pregaming as an intervention outcome.

Pregaming-specific interventions may also benefit from targeting the consistent link between pregaming and alcohol-related consequences (Borsari et al., 2007; LaBrie, Hummer, et al., 2011; LaBrie & Pedersen, 2008; Paves et al., 2012; Pedersen & LaBrie, 2007; Zamboanga et al., 2010). Specifically, training in use of protective behavioral strategies and skills to

manage social pressures to drink could be helpful and result in increased self-efficacy to avoid pregaming or to reduce the risks associated with this behavior. This may be especially effective with first year students, many of whom engage in pregaming and are less experienced drinkers with fewer skills to manage drinking situations (Barnett et al., 2013; Glindemann et al., 2006).

Similarly, cognitive variables such as pregaming motives and normative perceptions may serve as opportune targets in pregaming-specific interventions. Specific motives for pregaming have been identified (Pedersen et al., 2009; Pedersen & LaBrie, 2008; Read et al., 2010), culminating in the development of the Pregaming Motives Measure (PGMM; Bachrach et al., 2012) and the Prepartying Motivations Inventory (PMI; LaBrie et al., 2012). This research has uncovered both practical (to save money, avoid arrest) and enhancement (enjoy evening more, facilitate intimacy) motives for pregaming, and both measures could provide rich topics of feedback or discussion in the content of an intervention. Finally, college students overestimate the frequency and quantity of pregaming by peers (Pedersen & LaBrie, 2008), as well as peer approval (Rutledge, McCarthy, & Lendyak, 2014), resulting in perceptions of a permissive social context for pregaming. Thus, providing corrective normative feedback on overestimations of pregaming among similar peers may be expected to alter students' perceptions of how often their peers drink and how much alcohol they consume while doing so, in which case changes in pregaming norms may also be expected to change, and perhaps mediate, intervention effects on pregaming behavior.

The results of the study should be interpreted in the context of some limitations. First, this was a small and exploratory study, and confidence in the findings would be enhanced by replication at other sites and in larger samples. For example, replicating the lack of pregaming reductions after a BMI that did reduce other alcohol consumption variables (e.g., past month drinking frequency, typical, and peak blood alcohol levels) would provide compelling evidence that pregaming is resistant to traditional BMIs that do not target specific high-risk practices like pregaming. Second, the sample was predominately White and was collected at a small liberal arts school in the northeast. Although differences have been found in ethnic subgroups (White, Hispanic/Latino(a), Asian Pacific Islander Americans) on pregaming frequency and quantity of alcohol consumed; engagement in pregaming is consistently linked to alcohol-related consequences regardless of ethnic group (Paves et al., 2012). Therefore, cultural adaptations of current and future pregaming interventions may be warranted. Third, not all sessions in the parent trial were coded due to equipment failure, reducing the power to detect possible BMI effects on pregaming frequency. Fourth, as recruitment occurred on a rolling basis throughout the school year, findings may have differed depending on timing of the BMI (e.g., beginning vs. end of the academic year). Finally, there is potential variability in how much time was spent talking about pregaming. While some BMIs included pregaming content, it was brief, and not a primary focus of the BMI discussion. Standardization of pregaming content of the BMI, combined with random assignment to receive this pregaming intervention, would provide a stronger test of whether BMI can reduce pregaming frequency.

In conclusion, this project demonstrated that mandated students continue to report pregaming at a similar frequency following a BMI, regardless of whether pregaming is

briefly discussed in the intervention, and across both genders. Such findings highlight the need for future research to design and test interventions that specifically address this persistent high-risk behavior. Fortunately, recent research has identified several promising behavioral (e.g., protective strategies) and cognitive (e.g., motives) targets that can be incorporated in future pregaming interventions.

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Notes on contributors

Brian Borsari received his PhD in clinical psychology from Syracuse University in 2003. He is currently at the San Francisco Veteran Affairs Medical Center and Professor in Residence in the Department of Psychiatry at the University of California - San Francisco. His research interests 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, and in-session processes of motivational interviewing that are related to behavior change. In 2007, Dr. Borsari joined the Veteran Health Administration as a clinical psychologist. His research interests there involve the assessment and treatment of substance use disorders, training VHA staff in motivational interviewing and other client-centered communication to facilitate behavior change, and working with veterans who are attending college.

Jennifer E. Merrill, PhD, is an Assistant Professor at the Center for Alcohol and Addiction Studies at Brown University. She is interested in the etiology and treatment of alcohol misuse among young adults, with a current focus on how college students subjectively evaluate the consequences of their drinking.

Ali Yurasek 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 adolescents and young adults, with particular interest in examining behavioral economic concepts as mechanisms of change.

Mary Beth Miller is a first-year postdoctoral 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 process by which personalized feedback on one's health and behaviors may facilitate behavior change.

Kate B. Carey is a clinical psychologist and Professor of Behavioral and Social Sciences at Brown University School of Public Health. Her research interests include the social, psychological, and environmental causes and consequences of risky drinking, and the factors contributing to alcohol-related risk reduction. She designs and evaluates brief interventions for at-risk drinking, and has tailored brief interventions for various populations, including young adults attending college, psychiatric outpatients, and heavy drinkers in the community.

Glossary

Brief motivational	A method of decreasing health-risk behaviors that utilizes motivational interviewing and objective feedback to encourage

intervention (BMI)	individuals' thoughtful consideration of current behaviors (e.g., alcohol use) and related consequences; typically delivered in one to two sessions.
Heavy episodic drinking	For men, consumption of five or more drinks on one occasion or within two hours. For women, consumption of four or more drinks on one occasion.
Motivational interviewing	A collaborative, nonjudgmental style of communication designed to explore; increase intrinsic motivation and commitment to behavior change (Miller & Rollnick, 2013).
Pregaming	Consuming alcohol prior to attending a social event, where additional alcohol may or may not be available and/or consumed (also known as "frontloading" or "predrinking").
Risky alcohol use	Engagement in four or more heavy drinking episodes and/or experience of five or more alcohol-related problems in the past month.

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Table 1

Descriptive statistics for BMI and assessment only groups at 6-week assessment prior to randomization.

Variable	BMI *n* = 145 M (SD or %)	Assessment only *n*= 124 M (SD or %)	Test statistic(t/χ^2)	*p*
Demographics				
Age in years	18.70 (0.81)	18.59 (0.73)	1.14	.26
Gender			0.66	.42
Male	95 (65.5%)	87 (70.2%)		
Female	50 (34.5%)	37 (29.8%)		
Race			10.41	.001
White	143 (99.3%)	113 (91.1%)		
Non-white	1 (0.7%)	11 (8.9%)		
Year in school			4.55	.10
Freshmen	92 (63.9%)	92 (75.4%)		
Sophomore	42 (29.2%)	26 (21.3%)		
Upperclassmen	10 (6.9%)	4 (3.3%)		
GPA	3.03 (0.44)	3.04 (0.43)	0.06	.96
Alcohol use				
Frequency of drinking[a]	9.75 (6.27)	10.54 (5.87)	1.03	.31
Heavy episodic drinking[a]	7.09 (4.84)	8.04 (4.59)	1.63	.11
Peak BAC[a]	0.19 (.09)	0.22 (.10)	2.53	.01
Dependent Variable	6.59 (4.48)	7.40 (4.84)	1.42	.16
Pregaming Frequency[a]	5.72 (4.93)	5.79 (4.57)	0.11	.91

Note: Heavy episodic drinking is defined as five or more drinks per occasion for men (four or more for women); BAC = blood alcohol content

[a]Past month

Table 2

Means and standard deviations on pregaming frequency of BMI and assessment only groups at each assessment.

	6 week	3 month	6 month	9 month
Groups	M(SD)	M(SD)	M(SD)	M(SD)
BMI	5.72 (4.93)	4.22 (4.12)	4.33 (4.00)	4.37 (4.30)
Assessment only	5.79 (4.57)	5.09 (5.15)	5.30 (5.47)	4.97 (5.09)

Note. Randomization to BMI or AO took place after the 6-week assessment among participants who continued to drink at risky levels. Therefore, the 6-week assessment represents the first measurement. Means did not significantly differ by group at any time point (*ps* < .05).

Table 3

Hierarchical linear model predicting pregaming frequency by condition (BMI vs. assessment only).

Fixed effect	B	SE	*t*-ratio	*p*
Frequency of drinking	0.47	0.03	16.08	< 0.001
Intercept of Pregaming	0.83	0.31	2.66	0.01
Frequency				
Condition effect	0.32	0.37	0.86	0.39
Initial intervention response	− 0.47	0.30	− 1.54	0.13
Condition effect	− 0.34	0.42	− 0.82	0.42
Change across follow-ups	− 0.10	0.18	− 0.53	0.59
Condition effect	0.07	0.25	0.29	0.77

Table 4

Hierarchical linear model predicting pregaming frequency by pregaming discussion during BMI.

Fixed effect	B	SE	*t*-ratio	*p*
Frequency of drinking	0.45	0.04	10.17	< 0.001
Intercept of Pregaming	1.13	0.39	2.87	0.01
Frequency				
Pregaming Discussion effect	− 0.06	0.61	− 0.09	0.93
Initial intervention Response	− 0.65	0.34	− 1.91	0.06
Pregaming Discussion effect	0.13	0.70	0.18	0.86
Change across follow-ups	− 0.05	0.23	− 0.23	0.82
Pregaming Discussion effect	− 0.16	0.47	− 0.35	0.73

Note. Of the 121 BMI transcripts reviewed, 30 participants did discuss pregaming during the BMI and 91 participants did not.