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## A Preliminary Investigation of Caffeinated Alcohol Use During Spring Break

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### Abstract

**Background**—Caffeinated alcoholic beverages (e.g., Red Bull and vodka) are popular but associated with negative consequences. CABs may be particularly popular during Spring Break, a potentially risky social event.

**Objectives**—We aimed to identify the prevalence of Spring Break caffeinated alcohol use, determine how caffeinated alcohol use Spring Break drinking habits differ from usual, and examine the association between Spring Break caffeinated alcohol use and alcohol-related problems.

**Methods**—Data were collected from 95 college students during March of 2013 and 2014. Students completed questionnaires of their alcohol and caffeinated alcohol use before and during Spring Break and Spring Break alcohol-related problems.

**Results**—Approximately 54% of students used caffeinated alcohol during Spring Break. Spring Break caffeinated alcohol use was associated with more alcohol-related problems, even after controlling for other alcohol consumed and Spring Break vacation status.

**Conclusions/Importance**—Caffeinated alcoholic beverages are commonly consumed during Spring Break and their use uniquely predicted harms. Prevention efforts placed on caffeinated alcoholic beverage users may be helpful in reducing Spring Break-related harms.

### Keywords

Spring Break; college students; negative consequences; alcohol use; caffeinated alcohol

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Approximately 65% of college students consumed caffeinated alcoholic beverages (CABs), or alcoholic beverages (e.g., vodka) mixed with caffeine (e.g., Red Bull) in the past year (Berger, Fendrich, & Fuhrmann, 2013). Despite its popularity, heavier CAB use is associated

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#### Declaration of Interest

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with alcohol-related harms including alcohol dependence, other substance use (Snipes, Jeffers, Green, & Benotsch, 2015), and risk behaviors such as sexual risk behaviors and driving after drinking (Bonar, Cunningham, Polshkova, Chermack, Blow, & Walton, 2015). In addition, CAB use was associated with negative consequences after controlling for typical alcohol use (Brache & Stockwell, 2011). Students generally drink CABs to avoid experiencing sedative effects of alcohol to stay awake and continue partying (Jones, Barrie, & Berry, 2012; Marcziński, 2011; Peacock, Bruno, & Martin, 2013). Because many perceive that CABs can increase energy and enhance intoxication (MacKillop et al., 2012), these beverages may be particularly prominent in certain contexts. Limited extant research suggests CABs are commonly consumed in social environments, such as bars and clubs (Peacock et al., 2013), which promote heavy drinking (Rossow, 1996; Single & Wortley, 1993). It is possible that students consume CABs in other risky social events, such as Spring Break (SB) vacation.

SB can be a heavy drinking occasion for college students (Greenbaum, Del Boca, Darkes, Wang, & Goldman, 2005; Neighbors et al., 2011), associated with negative consequences (Lee, Lewis, & Neighbors, 2009). The risks associated with vacationing during this week have driven researchers to focus on developing interventions that target heavy drinking during SB (Lee et al., 2009). One explanation for these increased risks may be that students are more motivated to drink to have fun, be social (Patrick, Lewis, Lee, & Maggs, 2013), and become intoxicated (Sönmez, Apostolopoulos, Yu, Yang, Mattila, & Yu, 2006) during SB than the school year. Given that students are motivated to drink CABs particularly for these reasons (Jones et al., 2012; Marcziński, 2011; Peacock et al., 2013), it is possible that CABs are commonly consumed during SB. As CAB use and vacationing during SB pose unique risks, research investigating the prevalence of CABs during SB is warranted.

The purpose of the present study was to conduct a preliminary investigation of CAB drinking habits during SB. The current study had three aims. First, we sought to identify the prevalence of SB CAB consumption. Second, we aimed to determine how college students' CAB use habits differ (a) from usual and (b) depending on whether they vacationed during SB. We hypothesized that students would consume more CABs and consume CABs more frequently during SB than normally, and those who vacationed would consume more than those who did not. Third, we aimed to examine the relationship between CABs consumed during SB and negative consequences. We hypothesized that heavier CAB use during SB would predict harms beyond the amount of alcohol consumed or whether someone vacationed during SB.

## Method

Participants were 95 (70 women) students recruited from an undergraduate psychology research pool in a mid-size East Coast university in Spring 2013 and 2014. Participants were between 18 and 25 years old and reported heavy episodic drinking (i.e., 4+/5+ drinks in one sitting for women/men) at least twice in the past month. Average age was 20.42 ( $SD = 1.67$ ) years. See Table 1 for demographic information. No differences in demographics or baseline drinking were observed between the two samples.

Data were collected online before and after SB. Students completed the baseline survey 1 to 2 weeks prior to SB and a follow-up survey within two weeks after SB where participants reported their drinking behaviors during SB. Participants received course credit for participating and were entered into a raffle for a \$25 gift card. This study was approved by the university's committee on human subjects research and followed American Psychological Association (2002) guidelines.

## Measures

Baseline CAB and alcohol use were assessed with the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985) where participants indicated the number of CABs and alcoholic beverages typically consumed during a typical week. Regarding alcohol use, students were presented with a calendar grid from Monday through Sunday and were asked to report the number of non-caffeinated alcoholic drinks they typically consume on each of these days during the past three months. Modified instructions were provided for CAB use such that participants were asked to report specifically on the number of caffeinated alcoholic beverages only. CABs were defined as any caffeine (e.g., energy drink, soda) mixed with alcohol (e.g., vodka, rum). Drinks per drinking day and use frequency were used as drinking indicators of baseline alcohol and CAB consumption.

Alcohol consumed during SB was assessed using a modified 11-day Timeline Followback (Sobell & Sobell, 2002). Participants were provided with an 11-day calendar grid representing the duration of the university's SB holiday and were asked to report the number of CAB and alcoholic drinks consumed on each of these days. Drinks per drinking day and use frequency were used as drinking indicators of SB alcohol and CAB use.

SB alcohol-related problems were assessed with a modified 24-item Brief Young Adult Alcohol Consequences Questionnaire (Kahler, Strong, & Read, 2005) with *yes* (2) or *no* (1) response options. Reliability was  $\alpha = .89$ .

To assess Spring Break plans, participants were asked, "What did you do during Spring Break?" with response options of (1) stayed home in the city affiliated with the university, (2) stayed with parents or relatives, (3) vacationed with parents or relatives, and (4) vacationed with other students or friends. Those who selected options 1 or 2 were classified as "non-vacationers"; others were classified as "vacationers."

## Results

Prior to conducting analyses, data were inspected for outliers on alcohol outcome variables. Descriptive statistics of alcohol consumption during SB were conducted to address the first aim. Approximately 88% reported any alcohol use (including both alcohol-only and CABs) and 53.6% reported CAB use specifically during SB. For the second aim, we used paired samples t-tests to examine differences in CAB use at baseline versus during SB based on vacation status. For those who did not vacation, SB CAB use (2.02 drinks per drinking day,  $SD = 0.92$ ) did not significantly differ from baseline (2.66 drinks per drinking day,  $SD = 1.95$ ),  $t(23) = 1.75$ ,  $p = .093$ ,  $d = 0.42$ . For those who vacationed, SB CAB use (3.28 drinks per drinking day,  $SD = 2.28$ ) did not differ from baseline (2.94 drinks per drinking day,  $SD =$

1.53),  $t(10) = -0.79$ ,  $p = .450$ ,  $d = 0.18$ . Regarding CAB use frequency, for those who did not vacation, SB CAB use (1.76 days,  $SD = 2.48$ ) did not differ from baseline (1.88 days,  $SD = 1.62$ ),  $t(48) = 0.37$ ,  $p = .714$ ,  $d = 0.06$ . For those who vacationed, SB CAB use (2.59 days,  $SD = 2.91$ ) did not differ from baseline (2.05 days,  $SD = 1.65$ ),  $t(21) = -0.82$ ,  $p = .420$ ,  $d = 0.23$ .

Independent samples t-tests were conducted to examine differences in CAB use during SB for those who did versus did not vacation. SB CAB drinks per drinking day did not significantly differ between those who went on SB (2.89 drinks,  $SD = 2.06$ ) as compared to those who did not (2.14 drinks,  $SD = 1.14$ ),  $t(17.77) = -1.33$ ,  $p = .199$ ,  $d = 0.45$ . Those who vacationed did not drink more frequently (2.27 days,  $SD = 2.78$ ) than those who did not vacation (1.76 days,  $SD = 2.54$ ),  $t(90) = -0.85$ ,  $p = .399$ ,  $d = 0.19$ .

For the third aim, two hierarchical multiple regressions were used to test the unique predictive utility of SB vacation status, SB alcohol use and SB CAB use in accounting for SB-related harms. For each regression, vacation status and SB alcohol use (either use quantity or frequency) were entered as controls at Step 1 and CAB use (matching on drinking indicator) was entered at Step 2. In the first regression, after entering controls, CAB use frequency was associated with harms; adding CAB use frequency significantly increased the variance explained in the model (see Table 2). In the second regression examining CAB use quantity (i.e., CAB drinks per drinking day), after entering controls, the number of CABs consumed per drinking day was not related to harms,  $B = 1.08$ ,  $SE = 0.69$ ,  $p = .122$ .

## Discussion

College students going on SB vacation have been shown to be at-risk for heavy drinking and negative consequences. Research on SB drinking has not considered the prevalence of potentially risky beverages, such as CABs. Given that the motivations for drinking CABs are similar to the intentions for SB behavior, CABs may be prevalent during SB. Our preliminary findings revealed that CAB use was prevalent, with 53.6% of students consuming these beverages during SB. We did not find any significant differences in CAB use within participants (i.e., baseline vs. SB) or between participants (i.e., vacationers vs. non-vacationers). Effect sizes ranged from small to medium; thus, some differences may exist, but the small sample size in the present study may have lacked sufficient power to achieve statistical significance. Another explanation may be that college students do not differ in their CAB consumption based on their participation in specific events, such as SB. It is possible that those who enjoy the effects of CABs continued to drink CABs on SB and those who avoid CABs continued to avoid them while on SB. Importantly, though, there was a significant link between how often someone consumed CABs during SB and their risk for harms. We found that after controlling for vacation status and alcohol use, CAB use frequency predicted negative consequences. Thus, more frequent CAB use is a stronger predictor of consequences than whether someone vacationed during SB and how frequently they consumed alcohol. Overall, although students did not drink CABs more frequently than usual, the problematic effects of CAB use that have been demonstrated on college campuses in general (see Linden & Lau-Barraco, 2014 for a review) is also demonstrated during SB.

Given that more than half of students reported consuming CABs during SB, additional research is warranted.

Findings from the current study may provide some support for prevention efforts addressing SB drinking habits to minimize alcohol-related harms, particularly with regard to addressing frequency of CAB use on break. That is, although the amount or frequency of CABs used did not differ from usual or depending on vacation status, an important aspect of our findings is that the more frequently students drank CABs, the greater their risk of experiencing negative consequences from drinking. Thus, efforts to include a brief component educating students on the potential harms of consuming CABs in existing SB-specific interventions (Lee et al., 2014) could be beneficial in minimizing such harms among CAB users.

There are several limitations to note. First, as our study was intended to be a preliminary study, the sample size was restricted and there may not have been enough power to detect certain effects. Our definition of CAB use included the co-use of alcohol and any caffeine mixers, consistent with some previous literature (Lau-Barraco, Millettich, & Linden, 2014), but not others examining only energy drink mixers (O'Brien, McCoy, Rhodes, Wagoner, & Wolfson, 2008). In addition, because the majority of our participants were women (74%), our findings may not generalize to men. Lastly, because our study is cross-sectional, we cannot make causal inferences.

## Acknowledgments

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## Glossary

<b>Caffeinated alcohol</b>	Self-mixed beverages that contain both caffeine (e.g., Red Bull) and alcohol (e.g., vodka)
<b>Spring Break</b>	Typically a week-long vacation for students during the Spring semester

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**Table 1**

## Demographic Information

Variable	%
Class Standing	
Freshmen	27.4%
Sophomores	18.9%
Juniors	22.1%
Seniors	31.6%
Ethnicity	
Caucasian	57%
African American	27.4%
Hispanic	5.3%
Asian	3.2%
Native American/Alaskan Native	2.1%
Native Hawaiian/Pacific Islander	1.1%
Self-identified as "other"	4.2%
Spring Break Plans <sup>a</sup>	
Stayed with Parents/Relatives	38.9%
Stayed Locally	31.6%
Vacationed with Other Students/Friends	24.2%
Vacationed with Parents/Relatives	3.2%

*Note.*

<sup>a</sup>Those who vacationed with friends or family during Spring Break were categorized as vacationers (27.4%); all others were categorized as non-vacationers (70.5%).

**Table 2**  
 Summary of Hierarchical Regression Analysis Predicting Spring Break Alcohol-related Problems

Variable	$\beta$	B	SE (B)	R <sup>2</sup>	R <sup>2</sup>
Step 1				.23	**
Spring Break status	.07	0.75	1.00		
Alcohol use frequency	.69	**	0.46	0.14	
Step 2				.29	**
CAB use frequency	.51	*	0.28	0.19	.06*

Note. Spring Break status is coded as 0 = non-vacationers and 1 = vacationers. CAB = caffeinated alcoholic beverage.

\*  $p < .01$ .

\*\*  $p < .001$ .