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Web-Based Intervention to Change Perceived Norms of College Student Alcohol Use and Sexual Behavior on Spring Break

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Abstract

The purpose of the present study was to evaluate an adapted web-based multi-component personalized feedback intervention to reduce college student alcohol use and risky sexual behavior during Spring Break. This is one of the first interventions focused on Spring Break alcohol use and related sexual behavior. Personalized feedback intervention components addressed intentions, expected consequences, norms, motivations, protective behavioral strategies, and pacts with friends. Participants were college students (*N*=263; 55% women) between the ages of 18 and 21 who planned to go on a Spring Break trip with their friends. Effects were not significant in reducing alcohol use or sexual behavior during Spring Break or some of the proposed intervention mechanisms. However, consistent results showed that the intervention succeeded in reducing perceived social norms for Spring Break drinking and sexual behavior. Findings suggest that changing norms alone is not sufficient for changing risk behavior during this event and alternative strategies are needed to impact other putative mediators.

Keywords

alcohol; sexual behavior; web-based intervention; college students; Spring Break; norms

1.1 Introduction

Event-specific drinking research has identified several holidays, events, and times at which many college students increase their alcohol consumption and risk for related consequences (Del Boca et al., 2004; Neighbors et al., 2007; Neighbors et al., 2011a). Consequences due to alcohol use in event-specific drinking circumstances are likely to vary across events and in comparison to other drinking situations. For example, 21st birthdays have been associated with extreme quantities of consumption and attempts to consume 21 drinks which may result in alcohol poisoning, whereas Spring Break norms may be more likely to facilitate alcohol-related sexual risk-taking (Neighbors et al., 2012b). Targeting high-risk drinking during

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these known windows of opportunity has many benefits including increased ecological validity and potential to decrease negative consequences during peak drinking occasions. Recent intervention work targeting on 21st birthday drinking is promising for reducing high-risk drinking (Neighbors et al., 2009; Neighbors et al., 2012a). The purpose of the present study was to extend this event-specific drinking research to focus on college student Spring Break by evaluating an adapted web-based multi-component personalized feedback intervention designed to reduce college student alcohol use, risky sexual behavior, and related consequences.

College Spring Break is a time of increased risk for heavy alcohol use and related consequences, even among students who are typically lighter drinkers (e.g., Beets et al., 2009; Del Boca et al., 2004; Goldman, et al., 2011; Lee et al., 2009; Sönmez et al., 2006). In particular, college students who travel on a Spring Break trip, and in association with friends, are at greater risk for drinking and related problems than those who do not travel with friends (Grekin et al., 2007; Lee et al., 2006). Patrick and Lee (2012) found that people who go on trips engage in more risk behaviors during Spring Break than those who don't go on trips: On trip days, students had a greater likelihood of drinking and of having sex, consistent with prior research (Maticka-Tyndale et al., 1998). Further, alcohol use has been associated with risky sexual decision-making during Spring Break (Sönmez et al., 2006), and Spring Break days on which students consumed alcohol, compared with days on which students did not drink, were associated with increased sexual behavior (Patrick, 2013). Findings from these studies support the need for development of effective event-specific strategies for reducing Spring Break drinking and risky sexual behavior.

1.1.1 Prevention Strategies for Addressing Event-Specific Drinking

The Brief Alcohol Screening and Intervention for College Students program (BASICS; Baer et al., 2001; Dimeff et al., 1999; Marlatt et al., 1998) is an example of an effective intervention designed to reduce high-risk alcohol use. BASICS has been shown to reduce alcohol use up to four years later, especially among high-risk college drinkers (Baer et al., 2001; Carey et al., 2006; Wood et al., 2007). It employs personalized feedback to create discussion about the role of alcohol in the individual's life and to increase contemplation for moderate use or non-use by developing discrepancies between one's use and impact on life goals (Dimeff et al., 1999). Recent research that evaluates personalized feedback delivered via the web has found it to be efficacious for reducing college student drinking (e.g., Doumas et al., 2009; Neighbors et al., 2009, 2010).

Personalized feedback interventions have been adapted to address drinking on 21st birthdays. In a series of studies, Neighbors and colleagues (2009, 2012a) evaluated web-based and in-person personalized feedback interventions adapting BASICS to reduce alcohol use and consequences during 21st birthday celebrations. In the first study, the intervention significantly reduced estimated blood alcohol content (eBAC) levels compared to an assessment-only control group (Neighbors et al., 2009), being particularly effective for students who intended to consume more alcohol compared to students who intended to consume less; reductions in normative perceptions of 21st birthday drinking mediated intervention efficacy. Building on this, Neighbors and colleagues (2012a) found that an in-person traditional BASICS intervention given a few weeks prior to 21st birthdays was efficacious in reducing drinking and consequences among students celebrating turning 21. Examination of mode of delivery and 21st birthday-specific intervention programming was inconclusive.

While recent attention has indicated Spring Break as a high-risk period for heavy alcohol use, only a handful of studies have examined prevention strategies for Spring Break drinking. In one study, students who completed a diary of anticipated drinking and related

consequences prior to Spring Break experienced fewer alcohol-related problems during Spring Break compared to students who did not fill out the diary; however, there were no differences in amount of alcohol consumed (Cronin, 1996). In a study employing an educational session and examining perceptions of a safe Spring Break event, Snyder and Misera (2008) found that 90% of students indicated learning something new from the session and 85% indicated the information would be helpful during Spring Break; however, impact on actual drinking during Spring Break was not evaluated. Finally, Lee and colleagues (under review) examined event-specific feedback-based interventions (varying mode of delivery and incorporation of friends) for Spring Break drinking while on trips with friends, in comparison to assessment only and to a standard BASICS intervention. The only consistent effects on reduced Spring Break drinking (relative to the control group) came from the in-person Spring Break-specific intervention without the friend component, and mainly with respect to drinking on trip days. Lee et al. did not target motivations, pacts with friends, or sexual behavior. Further, changes in Spring Break drinking norms were found to mediate the in-person Spring Break-specific feedback intervention effects, but no support for changes in drinking intentions or in positive expectancies was found. None of the previous studies contained specific components dedicated to sexual behavior that often co-occurs with drinking on Spring Break.

1.1.2 Potential Mechanisms for Intervention

Interventions to reduce alcohol use and risky sexual behavior can capitalize on potential mechanisms for reducing risk behaviors documented in previous research. The current study examined four potential mechanisms. First, peer norms for alcohol use (e.g., Neighbors et al., 2007; Perkins, 2002), risky sex, and alcohol-related risky sex (Lewis et al., 2007, 2012) consistently predict behavior. Effective personalized feedback interventions typically include corrections of peer norms (Walters & Neighbors, 2005), and changes in normative perceptions mediate intervention efficacy (Borsari & Carey, 2000; Neighbors et al., 2004, 2006; Walters et al., 2009). Research regarding the use of personalized feedback to address sex behavior is just beginning, but with similar effects (Chernoff & Davison, 2005; Jaworski & Carey, 2001; Kiene & Barta, 2006; Lewis et al., under review).

Second, although traditional motivational interventions are based on the premise that motivations are an integral component of behavior change, most college student interventions do not have a formal component that includes feedback regarding motivations. Motivations for alcohol use (e.g., Cooper, 1994; Cooper et al., 1995; Cox & Klinger, 1988; Patrick & Maggs, 2010) and sexual behavior (e.g., Cooper et al., 1998; Patrick et al., 2011a) are consistent predictors of behavior.

A third potential mechanism is protective behavioral strategies (PBS) for alcohol use (e.g., spacing drinks; Martens et al., 2005) and sexual behavior (e.g., carrying condoms; Bryan et al., 2002). PBS are strategies aimed at limiting or reducing the behavior and/or minimizing the harm or likelihood of experiencing negative consequences (e.g., Benton et al., 2004; Martens et al., 2005). Changes in PBS have previously been shown to mediate intervention effectiveness for alcohol use (Larimer et al., 2007).

Finally, pacts or understandings with friends for safer drinking (e.g., to drink but not get drunk) and for safer sex (e.g., to use condoms) predict healthier Spring Break behavior (Apostolopoulos et al., 2002; Patrick et al., 2011b; Sönmez et al., 2006). Increasing understandings with friends regarding safer behavior was an additional proposed mechanism of the intervention.

1.1.3 Present Study

The purpose of the present study was to extend the literature on Spring Break drinking and sexual behavior prevention by examining a multi-component web-based personalized feedback intervention that was adapted from the prior work of Neighbors and Lee (Lee et al., under review; Neighbors et al., 2009, 2012a) and utilized many components from BASICS (Dimeff et al., 1999). Though the efficacy of prior web-based Spring Break interventions has not been previously demonstrated, web-based interventions for 21st birthdays have (Neighbors et al., 2009, 2012a). Due to the resource-efficiency of web-based interventions (Moore et al., 2005), the development of efficacious web-based Spring Break interventions is important and could have wide reach among college students. Therefore, we have adapted work from prior event-specific interventions to focus on both alcohol use and sexual behavior during Spring Break, and incorporated new components on motivations for drinking, sex, and pacts with friends (which have not been addressed in prior interventions). Research aims were to examine hypothesized intervention impacts on: (1) proposed intervention mechanisms (i.e., decreasing perceived norms and motivations for alcohol use and sexual behavior, increasing PBS and pacts with friends); and (2) Spring Break drinking and sexual behaviors.

1.2 Method

1.2.1 Participants

Participants were undergraduate college students who were screened into the Spring Break Behavior and Health (SBBH) study through the 2011 Student Life Survey (SLS), a biennial survey of undergraduates at a large Midwestern university (e.g., McCabe et al., 2005; McCabe, 2008). A random sample of 3,000 students was drawn from the Registrar's Office for participation in the SLS with a 47% response rate. Based on SLS data provided, eligible students were invited into SBBH. Eligible SBBH students (N=320; 23% of SLS participants) (a) were between the ages of 18 and 21 (86% of the SLS sample), (b) planned to go on a Spring Break trip with their friends (29% of the SLS sample), and (c) were willing to be re-contacted by researchers (86% of the SLS sample). Eligible students were mailed a pre-notification letter followed by an emailed secure link to the Wave 1 (pre-Spring Break) SBBH survey. All surveys were web-based. After the Wave 1 survey, participants were randomly assigned to the either intervention or assessment-only group. A Wave 2 SBBH survey was conducted immediately after Spring Break (one week post Spring Break). Participants were offered $25 and $30 for Waves 1 and 2, respectively. All procedures were approved by the university's Institutional Review Board and protected by a Federal Certificate of Confidentiality.

Of the 320 SBBH-eligible students contacted, 271 (84.7% response rate) completed the Wave 1 (pre-Spring Break) survey. At Wave 2 (post-Spring Break), 263 students (97.4% retention rate; 55% women) completed the survey. SBBH participants were allowed to check all race/ethnicities that applied to them, so that the sample was 78.2% White, 18.4% Asian, 4.6% African American, 2.6% Hispanic, 1.1% American Indian/Alaska Native, and 3.1% Other.

1.2.2 Intervention

Computerized, internet-based feedback was generated by a process during which (1) Wave 1 baseline surveys gathered information about respondents; (2) a computer program linked the data with algorithms used to select appropriate feedback messages based on individual baseline responses; and (3) the program rendered messages into a specific format and generated individualized web pages based on baseline responses and decision-making rules for appropriate feedback (Brug et al., 1999). The feedback was adapted from the effective

21st birthday intervention used by Neighbors et al. (2009) and from a similar intervention used by Lee et al. (under review), and was modified in three ways. First, sexual behaviors which often co-occur with drinking during Spring Break were included. Second, SBBH included Spring Break-specific motivations for and against drinking and sexual behavior. Highlighting students' own reasons for avoiding risky alcohol use and sexual behavior was designed to increase the personal salience of the feedback and the recommended protective strategies (Miller & Rollnick, 2002). Third, the intervention promoted making pacts with friends to engage in healthier behaviors (Patrick et al., 2011b).

Based on results of the baseline assessment, the intervention presented graphic feedback tailored to each participant's responses and included six components. A summary of information about intended Spring Break behaviors included number of drinks over how many hours (to calculate peak BAC), and intentions to engage in sexual behaviors and use contraception and disease protection (Cronin, 1996). Expected consequences reported by participants were used to provide feedback with a tailored list summarizing the expected negative aspects of their behavior. Appropriate cohort and age norms of typical college student behavior from the nationally representative Monitoring the Future study (Johnston et al., 2011) and of Spring Break behavior from other college student surveys were included. Actual and perceived normative information was presented graphically. Motivations included students' most important goals for Spring Break and ways in which alcohol or sexual behaviors might impede the experience of these. Highlighting students' own goals (e.g., having fun) and motivations for avoiding alcohol use and sexual behavior (e.g., avoiding embarrassing oneself) was intended to develop discrepancy with plans to engage in risk behaviors and increase the personal salience of the recommended strategies. Protective behavioral strategies (PBS) focusing on both alcohol use (e.g., spacing drinks; Martens et al., 2005) and sexual behavior (e.g., carrying condoms; Bryan et al., 2002) were included (Borsari & Carey, 2000; Neighbors et al., 2004, 2006, 2007; Perkins, 2002). Information about pacts with friends included encouragement and tips for having conversations with friends and partners about behavioral expectations (e.g., to drink but not get drunk) and making pacts with friends to look out for one another and to behave in healthier ways (Patrick et al., 2011b). Of the six components, four were measured as potential intervention mechanisms. (Intentions for behavior and expectations for consequences were not assessed at Wave 2 because they were not likely to be reported accurately after the actual Spring Break behaviors took place.)

1.2.3 Measures

Perceived Norms. Students were asked about their perceptions of other students' drinking and sexual behavior during Spring Break, including norms regarding maximum drinks, total drinks, sexual behavior, and drinking before sex.

Motivations regarding alcohol use during Spring Break were measured with the Importance of Consequences of Drinking (ICOD) measure (e.g., Lee et al., 2011; Patrick & Maggs, 2008, 2010), adapted for Spring Break (Patrick et al., 2013). Subscales included Fun/Social (5 items, α=.92), Relax (4 items, α=.87), and Image (4 items, α=.90) motivations for drinking, and Physical/Behavioral (8 items, α=.95) and Driving (4 items, α=.92) motivations against drinking. Motivations regarding sexual behavior during Spring Break were measured with the Sexual Motivations Scale—Revised (Cooper et al., 1998) and the Motivations Against Sex Questionnaire (Patrick et al., 2011a), adapted for Spring Break. Subscales included Intimacy (5 items, α=.98), Enhancement (5 items, α=.96), and Coping (5 items, α=.94) motivations for sex and Values (3 items, α=.91), Health (3 items, α=.88), and Not Ready (3 items, α=.82) motivations against sex.

Protective Behavioral Strategies. PBS were assessed with a modified Protective Behavioral Strategies Survey (Martens et al., 2005), addressing PBS use during Spring Break. Participants were asked to indicated how frequently they engaged in behaviors "when using alcohol or 'partying' during Spring Break" on a scale of *Never*, *Rarely*, *Sometimes*, *Usually*, and *Always*. Means for each of the three subscales were created: Limiting/Stopping drinking (7 items, α=.89, e.g., "determined not to exceed a set number of drinks"), Manner of drinking (4 items [a fifth item, "drank shots of liquor" (reverse-coded), was excluded], α=. 82, e.g., "drank slowly, rather than gulped or chugged"), and Serious Harm Reduction (3 items, α=.81, e.g., "used a designated driver").

Pacts with Friends. Students were asked, "Did you and your friends talk about your expectations for drinking on Spring Break?" and "Did you and your friends talk about your expectations for sex on Spring Break?" (1=*yes*, 0=*no*). In addition, they were asked, "Did you and your friends have a promise, agreement, or pact about drinking on Spring Break? (select all that apply)." Students who selected that they had a pact "to get drunk" were coded as 1, all others were coded as 0 (adapted from Apostolopoulos et al., 2002; Patrick et al., 2011b).

Spring Break Trip. Participants were asked where they spent each night of Spring Break. Students reporting that they were "On a Spring Break trip with friends" on at least one day was coded as 1; all else was coded as 0.

Spring Break Alcohol Use. Students were asked whether they drank any alcohol (1=*yes*, 0=*no*), the maximum number of drinks consumed within a 24-hour period, and the number of standard drinks consumed on each day of Spring Break (to compute the total number of drinks). The questionnaire was similar in format to a brief time-line follow-back (Sobell & Sobell, 2000) and the daily drinking questionnaire (Collins et al., 1985). A drink was defined for participants as a 12-ounce can (or bottle) of beer, a 4-ounce glass of wine, a 12-ounce bottle (or can) of wine cooler, or a mixed drink or shot glass of liquor.

Spring Break Sexual Behavior. Students were asked whether on Spring Break they had penetrative sex (defined as sex in which the penis penetrates the vagina or anus; 1=*yes*, 0=*no*), had sex without condom use (coded as 1=*did not* use condoms every time, 0=*did* use condoms every time), and consumed alcohol prior to or during sex.

Spring Break Alcohol-Related Consequences. Drinking consequences were assessed among participants who drank any alcohol during Spring Break. Students were asked, "During Spring Break, how many times did the following happen to you while you were drinking or because of your drinking?" Response options were 0=*None*, 1=*1–2*, 2=*3–5*, 3=*More than 5*. Items were adapted from the Importance of Consequences of Drinking (ICOD) measure of alcohol motivations (Lee et al., 2011; Patrick et al., 2013; Patrick & Maggs, 2008, 2010). Twelve items (α=.85) assessed the total number of negative consequences experienced, covering physical (e.g., hangover, coordination affected), behavioral (e.g., lost control, trouble with police/authorities), and driving (e.g., drove unsafely, car accident) consequences.

Spring Break Sex-Related Consequences. Sex consequences were assessed among students who had sex during Spring Break with the question, "During Spring Break, how many times did the following happen to you while you were having sex or because you had sex?" Response options were 0=*None*, 1=*1–2*, 2=*3–5*, 3=*More than 5*. Items were adapted from the Motivations Against Sex Questionnaire (Patrick et al., 2011a). Five items (α=.74) assessed consequences related to health, not being ready, and experiencing regret.

1.2.4 Plan of Analysis

To examine the intervention effects on proposed intervention mechanisms (Aim 1), regression analyses in SPSS were used to predict perceived norms, motivations, PBS, and pacts with friends for Spring Break by intervention group, gender, and whether the participant went on a Spring Break trip. To examine the intervention impacts on Spring Break behavior (Aim 2), three sets of regression analyses were used to predict alcohol use (maximum drinks, total drinks, and drinking consequences) and sexual behavior (having sex, not using condoms, drinking before sex, and sex consequences) during Spring Break (reported at Wave 2). Predictors for all models were the intervention, gender, and whether the participant went on a Spring Break trip. SPSS (method=enter) was used, with all predictors included simultaneously. To address the skewed distribution of outcome variables, additional regression models were examined after log-transforming the dependent linear variables. All of the major findings (including the significant intervention effects on norms but not on behavior) remained substantively the same. As a result, we have opted to keep the more straightforward non-transformed analyses in the results section.

1.3 Results

Students in the intervention group reported on a scale of 0=*not at all* to 4=*very* that the intervention was interesting (*M* [*SD*]=3.16 [0.90]), informative (2.96 [0.99]), accurate (2.32 [0.92]), and helpful (2.02 [1.23]). Descriptive statistics regarding typical behavior assessed at Wave 1 and Spring Break perceived norms measured prior to the intervention are shown in Table 1 to demonstrate that the intervention and control groups did not significantly differ prior to the intervention. In addition, post-Spring Break norms and Spring Break behaviors are shown for the intervention and control groups, documenting that the intervention condition had lower norms, but no differences in Spring Break behavior. All four perceived norms reported pre-Spring Break were higher than the same norms reported post-Spring Break (based on *t*-tests, all $p<.01$).

1.3.1 Intervention Effect on Proposed Intervention Mechanisms

Results pertaining to the first research aim for the impact of the intervention on perceived norms two weeks post-intervention (at Wave 2) are shown in Table 2. The intervention was associated with decreased perceptions for all drinking and sex norms: maximum drinks, total drinks, prevalence of drinking before sex, and prevalence of sexual behavior. Gender differences emerged for only one norm, with men reporting higher norms than women for maximum drinks on a single day on Spring Break. Students who went on a Spring Break trip reported greater perceived norms for the maximum drinks consumed by a typical student on Spring Break than did students who did not go on a trip; there were no differences for the other norms.

Potential intervention effects of additional intervention mechanisms, including motivations, PBS, and pacts with friends were also examined (not tabled). Controlling for gender and Spring Break trip, there were only two differences at a “trend” level of significance at $p < .10$ for alcohol use outcomes (out of 16 regression models: 11 motivations scales, 3 PBS scales, and 2 questions regarding Spring Break pacts). The intervention was associated with PBS related to manner of drinking (β=.102, p=.094) and more discussions with friends regarding expectations for Spring Break drinking (β=.112, p=.069). No other associations between intervention and proposed intervention mechanisms were found.

1.3.2 Differences in Behavior

The second research aim concerned intervention differences in alcohol use and sexual behavior, shown in Table 3. There were no main effects of intervention on any of the

behavior measures. Men reported more maximum drinks, total drinks, drinking consequences, and sex consequences during Spring Break than did women. Students who went on Spring Break trips reported more Spring Break drinking (maximum drinks and total drinks), but not more consequences, than students who did not go on a trip. There were no differences on sexual behaviors based on Spring Break trip.

1.4 Discussion

The purpose of the present study was to evaluate an event-specific intervention to reduce Spring Break alcohol use and sexual behaviors, through a number of proposed intervention mechanisms. As such, it represents a growing effort to develop and evaluate effective intervention strategies that are precisely focused on high-risk events. We did not find support for the intervention in reducing drinking or sexual behavior, nor did we find strong effects for the intervention on most of the proposed intervention mechanisms, including motivations, PBS, and pacts with friends. We did, however, find consistent results indicating that the intervention was successful in reducing perceived drinking norms and perceived sex norms for Spring Break. Relative to control participants, intervention participants reported reduced perceived norms for Spring Break drinking and for Spring Break sexual behavior.

The present findings raise a number of interesting questions. First, why did the intervention appear to work very well in reducing norms but less well in affecting other intervention mechanisms? One possibility is that we have not yet identified good strategies for changing protective behaviors (e.g., spacing drinks, condom use), motivations, or pacts with friends, although the findings suggest that we may be moving in the right direction for at least two of these. In contrast, other trials of interventions for general drinking (e.g., Borsari & Carey, 2000; Lewis & Neighbors, 2007; Neighbors et al., 2004, 2010), event-specific drinking (i.e., 21st birthday; Neighbors et al., 2009), and alcohol-related sexual behavior (Lewis et al., under review) have demonstrated the effectiveness of reducing norms by providing explicit feedback regarding one's perceptions of the norm in comparison to the actual norm. Another possibility is that students care more, and hence pay greater attention to, information about their peers relative to other information. Future research should address how to increase the salience of other intervention information, perhaps also linking it to peers (e.g., prevalence of students committed to looking out for their friends). Last, it is also possible that norms are easier to manipulate than other putative intervention mechanisms.

A second question is why we would find effects on norms but not on behavior, given that a number of previous studies have found changes in norms to mediate changes in behaviors. One possibility is that there may be a dose-response relationship between changing norms and changing behavior. In most previous studies where changes in norms have been found to mediate changes in behavior, effects sizes for changes in norms have been consistently larger than effect sizes for changes in behavior (e.g., Borsari & Carey, 2000; Lewis & Neighbors, 2007; Neighbors et al., 2004, 2010). In the present study, effect sizes for intervention effects on norms, although relatively strong and very consistent, may simply not have provided a large enough change to impact drinking during Spring Break. The study may have been underpowered to detect behavioral changes. The present findings are similar to a previous study targeting 21st birthday drinking in which a birthday card that provided norms feedback was effective in reducing 21st birthday drinking norms, but the effect on norms was not sufficient to change drinking (Lewis et al., 2008). A related possibility is that, relative to typical drinking or other event-specific risk behaviors, the dose-response relationship between changes in perceived norms and drinking is weaker for Spring Break drinking and sexual behavior. Thus, larger changes in perceived norms may be necessary to impact Spring Break behaviors. Future research might begin exploring these possibilities by

evaluating relative strength of associations between perceived norms and behavior for different specific events and contexts.

Additional issues to consider include the route of administration and the specific event targeted. The jury is still out on whether web-based interventions for college drinking are as effective as the same intervention delivered in person (Carey et al., 2007). Research on interventions for sexual behavior is much more limited, and faces the same issues. Additional research is needed to evaluate whether lab-based intervention results in better outcomes than completing the same intervention in a remote location, and what types of internet-delivered interventions may be most effective at engaging students. With respect to the specific event targeted, researchers have begun to compare differences in behavior on different occasions. However, research has not yet considered the contexts themselves and whether different factors (e.g., length of event, how far from the home environment) may be operating for different events. It may be harder to change drinking and sexual behavior during some events than other events, based on how central these behaviors are to the event, and this may vary across individuals.

Given the present findings and above considerations, we would speculate on several modifications to the existing intervention that might increase the likelihood of reducing Spring Break drinking and sexual behavior. While the intervention was successful in reducing perceived norms, it did not change the other three proposed mechanisms including motivations, PBS, and pacts with friends. Thus, it seems most logical to modify intervention procedures for influencing these additional potential mechanisms. For example, rather than simply providing feedback about existing motivations for Spring Break drinking and sex, participants could be asked to generate alternative activities that could provide the same benefits (e.g., ways to have fun without excessive drinking, or ways to achieve intimacy without penetrative sex). Similarly, regarding PBS, encouraging participants to try specific strategies by assessing willingness and commitment to use strategies would help identify which strategies are most palatable and at the same might build commitment to use them. Finally, providing more specific assessment and direction regarding the nature and content of pacts with friends could be helpful (e.g., commit to not drinking more than a pre-determined number of drinks in a given evening or to not letting each other leave with someone they do not know). In addition, confirming agreement for specific pacts between participants and their friend(s) could reinforce their mutual commitments to each other. Future research should consider additional strategies for promoting personal reflection and addressing resistance to web-based interventions.

It is important to consider that this is a single study on one campus, which may not be representative of other campuses. To get a more complete picture, the results of this study must be considered in the context of other studies evaluating similar interventions. Unfortunately, few intervention studies have specifically targeted Spring Break drinking, and even fewer have targeted Spring Break sexual behavior, which underscores the importance of this study but also limits our ability to interpret null findings. In addition, the study may not have had adequate power to detect intervention effects with smaller effect sizes.

In sum, the present research provides support for an online personalized feedback intervention in changing normative misperceptions for Spring Break drinking and sexual behavior. At the same time, findings suggest that changing norms alone is not sufficient for changing drinking and sexual behaviors during this event. Alternative strategies are needed to impact other putative intervention mechanisms, which may include motivations, protective behaviors, and supporting commitments between friends regarding safer Spring Break behavior.

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Highlights

- Spring Break intervention reduced perceived social norms for alcohol use and sex
- Personalized feedback intervention did not reduce Spring Break risk behaviors
- Changing norms for Spring Break was not sufficient for changing behavior
- Additional prevention and intervention strategies for Spring Break are needed

Table 1

Descriptive Statistics of Two-Week Post-Intervention Perceived Drinking Norms and Spring Break Behaviors, by Intervention Condition

	Control Group *M* (*SD*)	Intervention Group *M* (*SD*)	Group Differences *t*(*df*), *p*-value
Typical Behaviors in the Past Year (Wave 1)			
% Used Alcohol	92.7 (26.11)	90.30 (29.71)	0.71 (269), *p*=.48
Maximum Drinks[a]	8.70 (5.29)	9.60 (5.88)	−1.26 (246), *p*=.21
Typical Drinks[a]	3.35 (1.41)	3.73 (1.79)	−1.83 (246), *p*=.07
% Had Sex	55.56 (49.88)	62.88 (48.50)	−1.22 (265), *p*=.23
Number of Sexual Partners[b]	2.11 (1.52)	2.56 (2.45)	−1.41 (159), *p*=.16
Spring Break Perceived Norms (Measured Pre-Spring Break, Wave 1)			
Maximum Drinks	8.88 (4.23)	8.07 (3.51)	1.69 (268), *p*=.09
Total Drinks	30.68 (20.42)	27.46 (20.12)	1.28 (269), *p*=.20
% Had Sex	45.24 (19.42)	42.06 (22.69)	1.24 (268), *p*=.20
% Drank before Sex	50.42 (26.35)	45.59 (27.21)	1.48 (269), *p*=.14
Spring Break Perceived Norms (Measured Post-Spring Break, Wave 2)			
Maximum Drinks	8.73 (3.72)	6.49 (3.30)	2.24 (260), *p*=.00
Total Drinks	32.29 (24.94)	17.53 (16.33)	14.76 (260), *p*=.00
% Had Sex	42.22 (20.15)	28.56 (19.35)	13.66 (260), *p*=.00
% Drank before Sex	45.08 (26.76)	32.57 (27.05)	12.51 (260), *p*=.00
Spring Break Behaviors (Measured Post-Spring Break, Wave 2)			
Maximum Drinks	5.23 (5.95)	5.23 (5.95)	−0.01 (261), *p*=.99
Total Drinks	17.96 (24.78)	17.95 (26.11)	0.01 (260), *p*=.99
Drinking Consequences[c]	3.02 (3.99)	3.23 (3.77)	−0.35 (171), *p*=.73
% Had Sex	22.90 (42.18)	22.73 (42.07)	0.03 (261), *p*=.97
% Drank before Sex[d]	48.28 (50.86)	64.29 (48.80)	−1.21 (55), *p*=.23
% No Condom Use[d]	48.28 (50.86)	57.14 (50.40)	−0.66 (55), *p*=.51
Sex Consequences[d]	0.67 (1.21)	0.97 (1.76)	−0.76 (57), *p*=.45

Note. *N*=261–271 unless otherwise noted

[a] Assessed among people who drank in the past year (*n*=248).

[b] Assessed among people who had penetrative sex in the past year (*n*=161).

[c] Assessed among people who drank alcohol during Spring Break (*n*=176).

[d] Assessed among people who had sex during Spring Break (*n*=60).

Table 2

Linear Regressions Predicting Perceived Norms for Spring Break Behavior at Wave 2

	Max Drinks β(SE)	Total Drinks β(SE)	Drank before Sex β(SE)	% Had Sex β(SE)
Intervention	−.31 (.43)***	−.33 (2.6)***	−.23 (3.3)***	−.33 (2.4)***
Male Gender	.14 (.43)*	.03 (2.6)	.04 (3.3)	−.05 (2.5)
Trip	.14 (.44)*	.07 (2.7)	.09 (3.4)	−.01 (2.5)
R^2	.132	.115	.062	.110

Note. *N*=262.

* $p < .05$,

** $p < .01$,

*** $p < .001$

Table 3

Linear and Logistic Regressions Predicting Spring Break Alcohol Use and Sexual Behaviors

	Max Drinks β(SE)	Total Drinks β(SE)	Drinking Consequences β(SE)
Intervention	−0.03 (.77)	−0.01 (3.8)	0.03 (.57)
Male Gender	0.38 (.78)***	0.33 (3.8)***	0.30 (.57)***
Trip	0.30 (.88)***	0.27 (4.3)***	0.08 (.65)
R^2	.214	.164	.091

	Had Sex OR [CI]	No Condom Use OR [CI]	Drank Before Sex OR [CI]	Sex Consequences β(SE)
Intervention	0.98 [.55, 1.75]	1.44 [.50, 4.12]	1.96 [.66, 5.78]	0.08 (.37)
Male Gender	1.03 [.57, 1.83]	0.88 [.30, 2.53]	1.35 [.45, 4.01]	0.36 (.38)**
Trip	1.49 [.81, 2.75]	0.60 [.19, 1.88]	2.14 [.67, 6.87]	0.02 (.41)
R^2				.141
Nagelkerke's R^2	.010	.029	.076	

Note. *N*=262–263 for maximum drinks (with none=0), total number of drinks (with none=0), and had sex (yes/no). Drinking consequences *N*=173 (only asked among those who drank during Spring Break); no condom use, drank before sex, and sex consequences *N*=57–59 (only asked among those who had sex during Spring Break).

** $p < .01$,

*** $p < .001$